

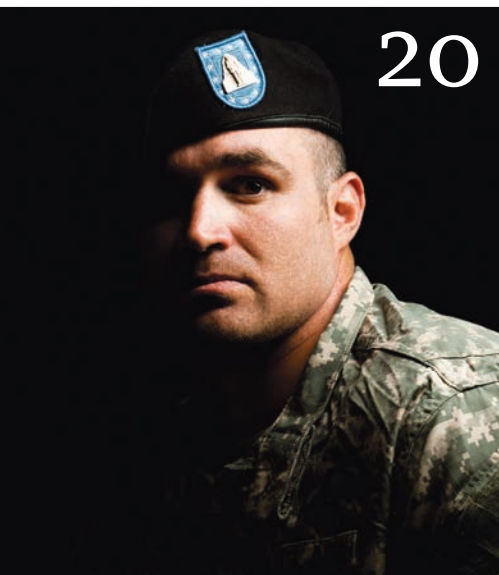


PULSE

SUMMER 2012 | A PUBLICATION *for* ALUMNI & FRIENDS *of* TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER

PTSD:
WINNING THE WAR WITHIN

PULSE



20

WINNING THE BATTLE WITHIN

Today, “Fake Jake” is no more. Jake Bundy finally put him to rest after years of struggling with post-traumatic stress disorder and is now ready for a career in occupational therapy. To help veterans like Bundy, the Paul L. Foster School of Medicine has signed on to the Joining Forces Initiative, coming to the aid of America’s military families.

12



AT THE CROSSROADS OF ACADEMIA AND INDUSTRY

The Pine Street corridor has been transformed from a pawn shopper’s paradise to a health care harbor, but there’s more to this revitalization than meets the eye. Through the partnership between TTUHSC and the Abilene community, there is an opportunity to advance education, research and the region’s economy.

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MISSION ACCOMPLISHED

When Paul P. Brooke Jr., Ph.D., FACHE, became dean of the School of Allied Health Sciences, he approached the job with the past in mind. “I used to say I came out [to TTUHSC] to see what would happen if I put all of the things that I had learned in my military experiences into practice. In all due modesty, it seems to have worked out pretty well.”

32



FRIDAY NIGHT LIFE

The play that Natalie Steadman, M.A.T., (SOAHS ’92) had prepared for her entire career was over in less than five minutes, but it is one she will likely never forget.

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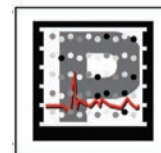
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Brian K. Mahmood

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PHARMACY '08

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Baylor University Medical Center,
Dallas, Texas



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ALLIED HEALTH SCIENCES '97

Owner, Monarch Physical Therapy
Boerne, Texas



TREVOR BRASEL, PH.D.
BIOMEDICAL SCIENCES '04

Study director, Regulated Studies,
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School of Medicine; Interim service director,
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NURSING '11, '06

Nurse Practitioner
San Martin de Porres Clinic and Kids First Pediatrics
Mission, Texas



Executive Vice President and Provost and School of Medicine Dean Steven L. Berk, M.D., Bernell Dalley, Ph.D., and Vaughan H. Lee, Ph.D.

Honoring a legend

After more than 35 years in the classroom, Bernell Dalley, Ph.D., has given his last lecture, but his passion for teaching and dedication to the School of Medicine will remain through a professorship established in his honor. In 1974, Dalley joined the faculty of the newly established School of Medicine and has since taught more than 3,000 medical students. During that time, he served 12 years as associate dean for admissions and minority affairs; he retired from his administrative position in 2009 and returned to teaching.

Vaughan H. Lee, Ph.D., is the first recipient of the Dr. Bernell Dalley Endowed Professorship in Medical Education. He has served as an associate professor in the Department of Cell Biology and Biochemistry since 2001.



Read more about Bernell Dalley, Ph.D., and his career with TTUHSC in the Summer 2009 and Winter 2006 issues of PULSE online.



ARE YOU READY FOR SOME FOOSBALL?

Friday night lights might be synonymous with football, but foosball seems to have been a primordial pastime at TTUHSC. Based on the photos we found in our archives, we're willing to bet there were some memorable moments made around the game table. Share your stories with us by emailing danette.baker@ttuhsc.edu. We just might crown a champion in an upcoming issue.

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INTERPROFESSIONAL EDUCATION: CONSTRUCTING A CULTURE OF TEAMWORK

No one can argue that health care has made tremendous strides over the last century. The vast amount of knowledge of the human body that has been acquired in recent decades has driven health care professionals to specialize in focused areas. This specialization, however, is not without its weaknesses. Research indicates that close to 70 percent of adverse patient incidents can be traced back to a lack of communication and collaboration among health care providers.

In a concerted effort to foster collaboration, communication and coordination, a new Interprofessional Education (IPE) initiative has been established at TTUHSC. Starting in the fall, all incoming students will be required to participate in an IPE Common Curriculum early in their degree programs. To be more specific, TTUHSC students from two or more health professions will be learning from, about and with each other to improve health-related outcomes, patient safety, and ultimately, their own job satisfaction.

The IPE Common Curriculum will consist of an online instruction component and a patient-centered interactive component. The online component will promote competency in four domains: (1) values/ethics, (2) roles/responsibilities, (3) interprofessional communication, and (4) teams/teamwork. The curriculum will culminate with students working in interprofessional teams to address patient care, population health and/or community problems.

This new initiative will ensure that all TTUHSC graduates possess the knowledge and skills to work collaboratively with other health professionals to provide safe, high quality, individualized care for patients. Our overarching goal is to establish an institutional culture that is committed to the value of interprofessional education and care.

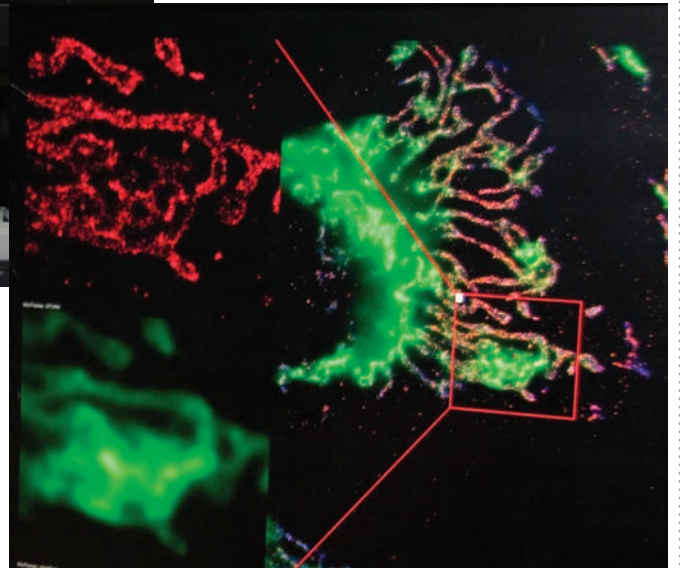
Tedd L. Mitchell, M.D.
President

New imaging facility

PROVIDES ADVANCED VIEWING CAPABILITIES



Souad R. Sennoune, Ph.D., co-director of the Image Analysis Core Facility, demonstrates the use of the Nikon Ti-E microscope with A1 confocal and STORM (Stochastic Optical Reconstruction Microscopy) super-resolution. The equipment allows for the imaging of cells and tissues labeled with fluorescent probes, using live or fixed specimens, to obtain 3-D images via conventional confocal microscopy. The images can be seen 6,000 to 10,000 times larger than with the naked eye.



New technology in the last decade has vastly improved the ability to view samples at resolutions previously unattainable. In March, TTUHSC unveiled the latest in high-tech imaging at its Image Analysis Core Facility at Lubbock, becoming one of only three institutions in the state to have such capabilities.

The new 1,200 square-foot facility houses more than \$2 million of laboratory equipment, the most powerful being a Nikon TiE confocal microscope equipped with an option known as N-STORM (Nikon Stochastic Optical Resolution Microscopy). This ultra-high resolution microscope enlarges images 6,000 to 10,000 times larger than the human eye can see.

The microscope utilizes fluorescent probes to mark molecules in the cells. It scans the images 50,000 times or more and within an hour can produce intricate images of the smallest structures in a sample. The images can also be combined to produce a 3-D model on a computer screen, so that the model can be moved to undergo more intricate analysis.

Raul Martinez-Zaguilan, Ph.D., director of the Core Facility, said it is more important than ever to acquire data from experiments in an increasing level of detail. Such analytical power is useful, for example, to see how viruses enter cells, potentially providing better ways to prevent them from doing so. It also allows investigators to study how proteins interact to understand cell function in normal and disease states.

For example, the Confocal Laser Scanning Microscopy, an existing method of imaging, generates slices from microscopic samples by means of optics. The sample stays intact, and the slicing may be repeated many times.

However, the image is blurred and lacks detail. Martinez-Zaguilan said with the aid of these new optical modalities, more detailed information can be obtained not previously available with any other type of optics. Further, the sample can be rotated and viewed at all angles.

“With this technology, we can perform experiments that could not be done before,” Martinez-Zaguilan said. “Hopefully it will open up more opportunities to obtain funding from research organizations such as the National Institutes of Health and others as we demonstrate our ability to produce state-of-the-art science.”



THE ENVELOPE(S)...

... and a drumroll please: Paul L. Foster School of Medicine students Dane Langsjoen (SOM '12) and Jessica Kranyc (SOM '12) were among those nationwide participating in Match Day festivities to learn where they will serve their residencies for the next three to five years. Langsjoen and Kranyc both matched with Texas A&M programs at Scott & White, respectively in internal medicine and obstetrics and gynecology.

Visit [PULSE](#) online to learn where TTUHSC medical students matched and experience the excitement of Match Day.

BOSWELL NAMED TO NEW ENDOWED NURSING CHAIR AT THE PERMIAN BASIN :: Carol Boswell, Ed.D., R.N., C.N.E., A.N.E.F., (SON '87) has been named to the James A. “Buddy” Davidson Foundation Endowed Chair in Evidence-Based Practice. The foundation provided a generous gift to the School of Nursing at the Permian Basin to establish this chair position, which will focus research efforts on rural health issues. The funding will support investigations related to the use of scientific nursing data in innovative patient care and implement improved health disparities research and programs throughout rural West Texas.

The new endowed chair will be housed at the Center of Excellence in Evidence-Based Practice, a collaborative initiative of the School of Nursing at the Permian Basin and Medical Center Hospital in Odessa.

Boswell is a professor in the School of Nursing and serves as co-director with Sharon Cannon, Ed.D., R.N., of the center. They also have co-authored an evidence-based practice research textbook and teaching textbook. Boswell also is involved with hospital colleagues in evidence-based projects locally and at the state level. In addition, she represents TTUHSC nationally as a member of the Board of Governors for the National League for Nursing.

The James A. “Buddy” Davidson Charitable Foundation has supported School of Nursing scholarships for Lubbock and the Permian Basin, as well as the F. Marie Hall SimLife Center and programs in the schools of Allied Health Sciences and Pharmacy.

Foster School of Medicine faculty creates fund for residency training in radiology

Arvin Robinson, M.D., professor and chairman of the Paul L. Foster School of Medicine Department of Radiology, along with his wife, Beverly, have created the Dr. Arvin and Beverly Robinson Department of Radiology Residency Fund at El Paso.

The Robinsons made a significant donation in February to begin the fund with a goal to reach \$1 million by 2015.

Robinson said that as the first medical school on the border, the Paul L. Foster School of Medicine has a tremendous opportunity to populate the region with future generations of radiologists who come to the school as medical school graduates seeking knowledge, direction and a sense of purpose.

The fund will be exclusively used to support scholarly activities of a senior radiology resident under the guidance of mentors with monitoring by an advisory committee. The goal for the Robinson fund is to add opportunities such as image correlated research, formal faculty development, and mentored teaching experiences and training to the current clinical practice preparation.

Donations to the fund can be made online at www.give2tech.com or by contacting the TTUHSC Office of Development at El Paso, (915) 0783-6270.

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minutes with the faculty...

ADVANCING KNOWLEDGE

SURESH PRASAD, M.D., FACP, (Resident '99) | Native of India; now lives in Odessa, Texas

In addition to his private medical practice, Suresh Prasad, M.D., FACP, is a clinical faculty member at the School of Medicine at the Permian Basin. He also is co-founder of Premier Research Group, The Permian Research Foundation, which provides infrastructure for conducting clinical research in conjunction with major pharmaceutical companies as well as privately initiated and funded projects. Prasad has served as principal and sub-investigator on multiple studies through the foundation.

“It always makes me proud to be involved in the new developments,” he said. “(Research) offers you

the opportunity to perceive how various medicines are developed and eventually put out in the market.”

For the past year, he has made presentations to residents and community health care professionals in Odessa and surrounding towns about new developments in medicine and health care – specifically focusing on common illnesses and diseases such as diabetes mellitus, hypertension, dyslipidemia, congestive heart failure and coronary artery disease.

“It always keeps me on my toes and stimulates me to learn about new developments in my field of interest,” Prasad said of his presentations. “Knowledge increases with sharing.”



ODESSA AMERICAN/MARK STERKEL

Graduated from Patna Medical College and Hospitals in eastern India; completed one year of an internal medicine residency in Chicago before transferring in 1997 to TTUHSC to complete his residency.

Shares a medical practice with his wife, Kalpana Prasad, M.D.

Specializes in sleep and internal medicine.

Participates in statewide preceptorship program, supervising medical students and residents as well as TTUHSC physician assistant and nurse practitioner students.

First faculty member from Odessa to be nominated for and receive the School of Medicine Distinguished Alumni Community Outreach Award.

HUNT SCHOOL OF NURSING PARTICIPATES IN GRANT TO ENHANCE WORK FORCE

The Gayle Greve Hunt School of Nursing is a grant partner in the U.S. Department of Labor H-1B Visa Technical Skills Training project entitled “Successful Transition and Retention (STaR) Program,” which provides education, training and job placement assistance for employers using H-1B visas to hire foreign nurses.

The STaR Program aims to raise the professional and technical skill level of U.S. graduate nurses so they can upgrade their employment and, over time, help Texas hospitals reduce their use of temporary skilled foreign professionals.

Consisting of two innovative pathways, the program offers on-the-job training for new graduate nurses so they can transition to the role of bedside nurses in a quality, efficient and cost-effective manner. The pathways will also provide accelerated, intensive training so that new graduate nurses may specialize through preceptorships.

The nursing school faculty will work closely, over the next four years, with the academic and hospital grant partners through an advisory board to develop and provide a high-quality clinical preceptorship program for the STaR preceptors. These preceptors will play a key role in the success of the graduate nurses, enrolled in the STaR Program.

More than 200 graduate nurses in El Paso and Austin are expected to benefit from the program, which was funded as a result of the extensive collaboration between the grant partners: Gayle Greve Hunt School of Nursing, the University of Texas at El Paso, the University of Texas at Austin, Hospital Corporation of American Hospitals and Workforce Board, Del Sol Medical Center, Las Palmas Medical Center, St. David’s Healthcare Partnership acute care facilities and three state work force boards are also participating in the program.

On-site INSTRUCTION

Corporate collaboration enhances educational opportunities, career options for pharmacy student

Last fall, as Brett Noteware, Pharm.D., (SOP ‘12) entered his final year at the School of Pharmacy, he had a basic understanding of his career options as a pharmacist. Today, that understanding is much deeper due in large part to his participation in the CVS Caremark Pharmacy Leadership Rotation.

Noteware was the first TTUHSC pharmacy student to complete the rotation, which introduces students to the CVS Caremark business model. It is a model the company has employed to successfully combine CVS/pharmacy stores, mail order pharmacy service, specialty pharmacy and retail clinics under one umbrella.

Noteware learned about the CVS rotation as a participant in the school’s combined Pharm.D./M.B.A. program. He said he thought the rotation offered a unique opportunity to learn about managed care pharmacy and observe how pharmacy benefit managers help control costs while ensuring quality. He compared the experience to learning a new language.

“The rotation allowed me to gain in-depth knowledge about an area of pharmacy I had very little knowledge of going in. All of the leaders at CVS Caremark were very generous with their time and extremely patient and helpful.”

The idea for the rotation began about a year ago in a discussion between School of Pharmacy Dean Arthur Nelson Jr., R.Ph., Ph.D., and David Joyner, a TTU alumnus who is the executive vice president of sales and account services for CVS



Brett Noteware and David Joyner

Caremark. Joyner recognized the synergy between the school goals and CVS Caremark’s values and proposed a collaborative rotation in which pharmacy students work with CVS Caremark leaders in the Dallas/Fort Worth area.

“We’re investing in the future of pharmacy through activities like this, and we were very pleased to open our doors to Brett and support his learning experience,” Joyner said.

Noteware isn’t sure if, or how, the rotation will ultimately influence his career goals. He intends to pursue a residency position and become a leader in the profession.

“I do feel like I am now more aware of the many different and unique job opportunities that the managed care area of pharmacy has to offer,” he said. “Managed care entities employ roughly 18,000 pharmacists nationwide; I wasn’t truly aware of this fact before the rotation.”

MATTERS of the HEART

Student athletes dying of sudden cardiac events are a recurring national headline. Eugene Luckstead, M.D., professor and vice regional chair of pediatrics at the School of Medicine at Amarillo, is on a mission to change that by advocating for EKGs (electrocardiograms) to be part of the required screening for student athletes for participation in extracurricular sports.

“There is no big reason to not do it,” he said. As a pediatric cardiologist, Luckstead has seen many cases that support his passion, including a patient who would have become one of those statistics.

“I had a patient who was referred because of a heart murmur that was caught during a routine physical. His EKG was abnormal. Upon examination, he was very high risk and a candidate for heart surgery.”

Luckstead, who speaks on the topic internationally, said there is no exact data of how many young people have died, as there is no national tracking for this information. “We do know that it happens two to three times as often in boys as it does in girls, and certain minorities such as Hispanics and Asians may have high risk factors,” he said.

For more than 20 years, EKG screenings have been part of athletic pre-screening by European and Olympic sports communities, Luckstead explains. For the past five years, he has been following a study by a Chicago physician who has been able to provide EKGs by training parent volunteers and charging \$20 or less for the screening, which is paid for by the athlete’s family.

“We have seen kids who have suffered from cardiac abnormalities, had surgery to correct the problem and then lead an active and healthy life,” Luckstead said. “No one test is 100 percent accurate, but any preventive test you can do is well worth it. If it is only one life you save, you made a difference.”

Matters of the Heart is a new narrative in PULSE designed to highlight the passion for health, wellness and humanity shown through the work of our faculty, staff and students. Story suggestions are welcomed.

Amarillo faculty member promotes cardiac screening for kids



STATE GRANT SUPPORTS SON'S EFFORTS TO INCREASE HEALTHY PREGNANCIES, BIRTHS ::

The School of Nursing has received a \$200,000 grant from the Texas Department of State Health Services to develop and enhance a local coalition to increase the number of healthy pregnancies and births and decrease infant mortality in Lubbock County.

Linda Brice, Ph.D., R.N., associate professor in the School of Nursing, will lead a regional community coalition to address conditions such as the high rate of preterm births and low birth weight babies, infant mortality, teen pregnancy, weight gain of less than 15 pounds during pregnancy, smoking during pregnancy, lack of father’s involvement, and lack of good prenatal care

Organizations participating include the March of Dimes, the Larry Combest Community Health & Wellness Center, Teen Parents of Lubbock, the Texas Department of State Health Services Region 1, the Garrison Institute on Aging, the City of Lubbock Health Department, UMC Health System and the United Way.

Brice is currently involved with a number of efforts with similar outcomes including the Anita Thigpen Perry School of Nursing’s annual Stork’s Nest Baby Shower and Teen Straight Talk, a free program aimed at opening the lines of communication between tweens, teens and their parents about topics such as sex, teen pregnancy, bullying and self-esteem.

JUST *the facts...*



78 TTUHSC students will have participated in international programs during this academic year in which they had the opportunity to experience cultural and national differences in health care systems. Their studies have taken them to 12 different countries including Australia, Botswana, Germany, Ghana, Japan, Peru and Spain.

10 years the Anita Thigpen Perry School of Nursing has hosted its Stork's Nest Baby Shower. The event has raised more than \$354,000 to support the incentive program that encourages pregnant women and teens to receive regular prenatal care.

53 grants totaling more than \$1.5 million have been awarded through the Laura W. Bush Institute for Women's Health to promote the well-being of women through research, education and patient care. The LWBIWH grant program's goal is to identify and fund research projects that have the highest likelihood of leading to strong extramural grant applications.



40 miles were walked by each loyal participant in the Walk with a Doc program at TTUHSC at Amarillo. For 13 weeks, community members were invited on the three-mile trek around various paths throughout the city. Julie Dai brought the national program to Amarillo this spring, during her third year of medical school. Walk with a Doc's mission is to encourage healthy physical activity in people of all ages and reverse the consequences of a sedentary lifestyle.



12 community telemedicine sites located throughout West Texas provide access to a spectrum of specialists including psychiatry, dermatology, endocrinology, pulmonology, urology, burn/wound care, and psychology. The services allow patients to receive care in their own community, saving hundreds of dollars in travel and lost wages. TTUHSC telemedicine is part of the F. Marie Hall Institute for Rural and Community Health.

{more} POWER of the Purse



This navy and white Oscar de la Renta purse, autographed and donated by former first lady Laura Bush, was among those auctioned at the event.



Friends of TTUHSC, Jerry and Margaret Hodge, with Jenn Smith and Jenni Gee from the Office of Development in Amarillo.

Laura W. Bush was in Amarillo in April for the Power of the Purse and applauded the work being done at the institute that bears her name.

The Power of the Purse event, now in its third year, gives attendees the opportunity to bid on handbags donated by local and international celebrities, handbag designers and the area's most fashionable boutiques. The more than \$250,000 raised through the luncheon will support the institute's research and educational outreach activities.

The Laura W. Bush Institute for Women's Health (LWBIWH) is collaborating with the School of Medicine to develop an innovative, four-year longitudinal medical education curriculum focusing on women's health and medicine. The work is based on scientific discoveries that have been made in the last 15 years. For example, women are 50 percent more likely than men to have adverse reactions to prescription drugs, yet most drugs do not have different dosages based on a patient's gender.

"Women across the country and around the world need answers to their unique health issues," Mrs. Bush said. "The Laura W. Bush Institute for Women's Health is committed to finding these answers."

The LWBIWH also is developing a lecture series for doctors, nurses and pharmacists. This series will educate health care providers about differences in diagnosis, prognosis and treatment of common health issues among men and women.

STATE FUNDING HELPS HEALTHY LUBBOCK INITIATIVE EXPAND REACH

The Garrison Institute on Aging has received support from the Texas Department of State Health Services to expand resources from its Healthy Lubbock initiative in Lubbock and Hale counties.

The \$434,000 Transforming Texas grant will enable Healthy Lubbock to focus efforts at worksites on tobacco cessation, implementing a safe healthy eating and active living infrastructure and increasing the use of high-impact, quality clinical preventative services.

The purpose of the Transforming Texas grant is to improve the health and quality of life for individuals, families, organizations and communities by creating healthy and safe communities, improving access to and integration of community prevention services and clinical services and to eliminate health disparities.

Another component of the grant includes collaborating with health care providers. Common health problems in Texas include high blood pressure, high cholesterol and diabetes. Most of these incidents are a result of unhealthy eating combined with little or no physical activity.

Wolslager Foundation gifts to support students, patients

The Wolslager Foundation has generously provided \$335,000 in scholarship support for students enrolled in the Paul L. Foster School of Medicine or the Gayle Greve Hunt School of Nursing.

The foundation also has made a contribution to the University Breast Care Center at the Paul L. Foster School of Medicine, which provides comprehensive care for El Paso women with breast disease and brings screening and treatment to medically underserved patients.



Collaboration brings focus on gender specific health to DFW

Texas Health Resources and the Laura W. Bush Institute for Women's Health (LWBIWH) have launched a collaboration that will leverage community involvement, education and research to empower women in the Dallas-Fort Worth area to take control of their health.

The collaboration will include monthly seminars featuring LWBIWH research as well as gender-specific continuing medical education courses the institute has developed for current and future health professionals. Additionally, the two entities will engage in research initiatives focused on female-related health and the impact of gender differences on health care.

Arlene Betancourt, M.D., an internal medicine specialist based in Dallas, will serve as the physician champion of the Texas Health Resources-LWBIWH collaboration.

The association will help the LWBIWH to establish a presence in the Dallas-Fort Worth area, home to 6.3 million residents, half of which are female.

KUDOS ... **KENDRA RUMBAUGH, PH.D.**, (GSBS '01) assistant professor, School of Medicine Department of Surgery, and **Barbara Pence, Ph.D.**, professor and director of research, School of Medicine Department of Pathology, are among the first cohort of faculty members named to the TTU Transdisciplinary Research Academy. Rumbaugh will work with a team on development of innovative research projects involving medical sciences, biology, engineering and physics. Pence, who is also joint associate professor of radiology at TTUHSC and adjunct associate professor of animal science and food technology at TTU, will work with a team interested in the effective delivery and marketing of food and health products from the public and private perspectives. The academy is designed to bring faculty members with diverse interests and from different disciplines together to explore questions that have a global impact and intersect with the strategic research themes of the university.

THOMAS ABBRUSCATO, PH.D., associate dean for the Graduate School of Biomedical Sciences and interim chair and associate professor for the Department of Pharmaceutical Sciences, has been selected as a charter member of the Drug Discovery for the Nervous System Study Section at the National Institutes of Health (NIH). He will serve a five-year term reviewing preclinical applications with the goal of discovering new drugs or molecular targets for treating or preventing disorders of the nervous system. He recently completed a term as a charter member of the NIH Brain Injury and Neurovasculature Pathology Study Section. **ALICE YOUNG, PH.D.**, has been named a fellow of the American College of Neuropsychopharmacology, recognizing her contributions to the field. She is associate vice president for research at TTU and TTUHSC and holds joint appointments as professor of psychology and pharmacology and neuroscience, respectively. In addition, Young is a member of TTUHSC's South Plains Alcohol and Addiction Research Center. **WRENNAH GABBERT, PH.D., M.S.N, R.N.**, associate academic dean for the Gayle Greve Hunt School of Nursing, is serving a six-year term on the Texas School Health Advisory Committee, part of the Department of State Health Services. As a committee member, Gabbert makes recommendations supporting a healthy and safe school environment. **ALEXIA GREEN, PH.D., R.N.**, professor and dean emeritus of the School of Nursing, is one of 13 members appointed by Gov. Rick Perry to the Texas Institute of Health Care Quality and Efficiency Board of Directors. The institute is charged by state legislation to improve health care quality, accountability, education and cost by encouraging health care provider collaboration, effective health care delivery models and coordination of health care services. Green will serve a two-year term. The J. William Fulbright Scholarship Board has named **AFZAL A. SIDDIQUI, PH.D.**, as an award recipient to India. For more than 20 years, Siddiqui, director for the Center for Tropical Medicine and Infectious Diseases and professor of microbiology and immunology at the School of Medicine, has studied parasitic diseases. The Fulbright award will enable him to work with health care professionals in India sharing his knowledge about parasites, technology and diagnoses. The prestigious Fulbright program is designed to increase mutual understanding between the people of the United States and the people of the more than 150 countries that currently participate in the program.

Discoveries

RESEARCH
& SCHOLARLY
ACTIVITY

As construction progresses on the expansion of the School of Pharmacy at Abilene, Jon Weidanz, Ph.D., M.P.H., works to build an innovative educational and economic initiative that he believes will benefit TTUHSC and bring business to the region.

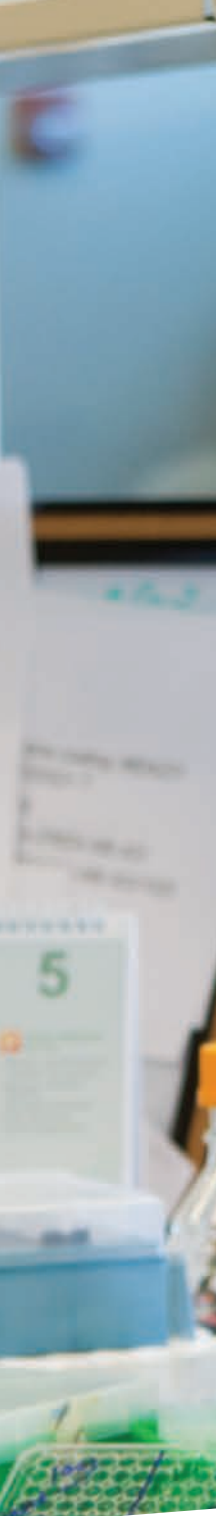




by danette baker | photos by neal hinkle

at the intersection of

TTUHSC, Abilene partnership has potential to build educational, research initiatives that will also advance local economy



As Jon Weidanz, Ph.D., M.P.H., makes the two-block drive between the TTUHSC School of Pharmacy and the Abilene Life Sciences Accelerator, he explains how the landscape along Pine Street has rapidly changed in the last five years — transforming from a pawn shopper’s paradise to an incubator for economic growth.

Literally, the corridor, which connects historic downtown Abilene to I-20, has been remodeled and revitalized, with funding from the Development Corporation of Abilene (DCOA) and Abilene Community Partners (ACP), in an attempt to revive not only an area of town, but potentially the entire region’s economy. Among the activity: construction of the schools of Pharmacy, in 2007, and Nursing, scheduled to open later this year, as well as a strong movement to bolster educational opportunities. Most recently, the TTU System Board of Regents voted in March to add a Department of Immunotherapeutics and Biotechnology within the School of Pharmacy. This comes on the heels of the Graduate School of Biomedical Sciences (GSBS) adding a new system-wide master’s level biotechnology program, headquartered at the Abilene campus. Also located at the school is the Center for Immunotherapeutic Research.

Weidanz holds several key positions in this commercial/academic partnership—director of the Center for Immunotherapeutic Research, professor in the School of Pharmacy, associate dean for GSBS, and director of the biotechnology program. He calls the partnership between TTUHSC and the DCOA “a match made in heaven.” Economic backing from the DCOA and educational expertise from TTUHSC has brought the areas of science and business together in a way that he fully believes is beneficial to both parties, based on his experiences in corporate and academic research.

“I think we have an opportunity to help shape the commercialization of life science technology at Texas Tech,” he said. “In helping to bring all of this together, one of my goals is to realize the potential in terms of what it can mean to the university and the region if we are successful in taking a concept from the laboratory and moving it down the path of proof of concept and building revenue. If you do it right, these discoveries can be beneficial in many ways.”

Since early 2007, the DCOA and ACP have contributed about \$22 million to the School of Pharmacy, providing full or partial funding for the facilities as well as program start-ups and faculty positions. TTUHSC and the DCOA partnered on the Center for Immunotherapeutic Research, which was established with a goal to bring together a critical mass of faculty focused on immunology strategies to detect and treat human diseases (*see pages 14-15 for details on researchers and their work*). The DCOA, in 2009, then built the Abilene Life Sciences Accelerator, an incubator for start-up companies developing commercial bioscience ventures.

The GSBS two-year master’s level program will add graduate research students to the Abilene campus by fall 2013 as well as at Amarillo, El Paso and Lubbock. Students will spend their first of two years in class and then complete internships or other learning experiences to finish their degrees.

academia and industry

Together, the school, center, master’s program and accelerator provide a rich environment that not only offers state-of-the-art educational experiences, but one that answers the Abilene community’s call for economic growth.

According to the Texas Healthcare and Bioscience Institute, the life sciences industry is a booming business. The industry’s total economic impact on Texas is estimated at \$75 billion in economic activity, 236,000 jobs, and \$31 billion in payroll; state and local governments receive an estimated \$2 billion each year.

With the elements in place in Abilene as well as other components throughout the TTU System, such as the Office of Research, Commercialization and Federal Relations, Weidanz believes TTUHSC can develop a unit similar to the IC² Institute at the University of Texas, which has an emphasis on enhancing education and research of the enterprise system and creating wealth through entrepreneurship. He has worked closely with Greg Pogue, Ph.D., a senior

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Jon Weidanz, M.P.H., Ph.D.

Professor, School of Pharmacy; director, Center for Immunotherapeutic Research; associate dean for Graduate School of Biomedical Sciences; director, MS program in Biotechnology; president, chief scientist and founder of Receptor Logic Inc.

Relocated from the School of Pharmacy at Amarillo in 2007; joined TTUHSC in 2000 after eight years in biotech industry working at a diagnostic company and then at a biotech startup as co-founder and lead scientist.

His research interest in immunotherapy has led to specific biomarkers that are targeted using a novel class of monoclonal antibodies dubbed TCRm to treat cancer and infectious diseases.

Center for Immunotherapeutic Research faculty

Ninh (Irene) La-Beck, Pharm.D.

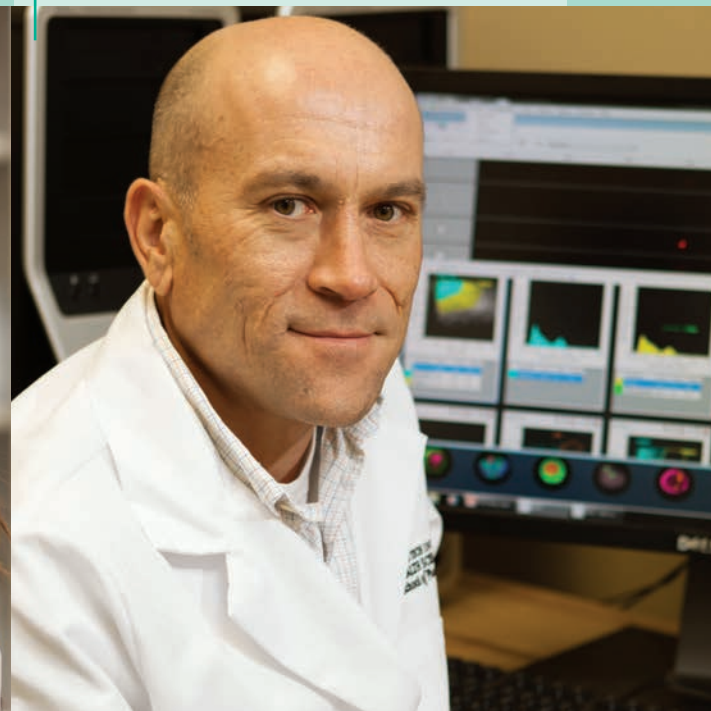
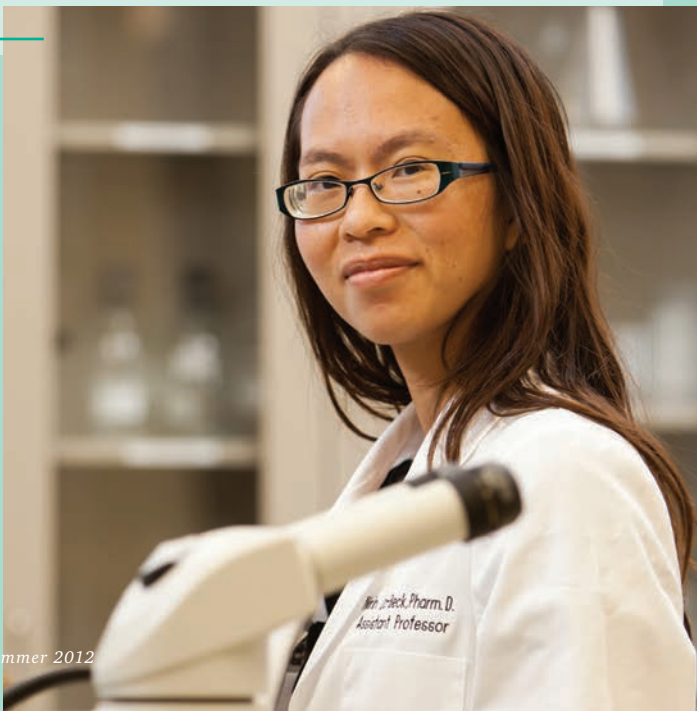
Assistant professor, School of Pharmacy

Joined TTUHSC in 2011 from the University of North Carolina Chapel Hill where she completed a fellowship in oncology. Her research focuses on drug formulations using nano particles and their interaction with the immune system.

Maciej Markiewski, M.D., Ph.D.

Associate professor, School of Pharmacy

Joined TTUHSC in 2010 from the University of Pennsylvania where he served as senior research investigator in the Department of Pathology and Laboratory Medicine. His research interests are in the biology of innate immunity, tumor immunology and tumor microenvironment. He received a grant in January from the Department of Defense for his research on innate immunity and breast cancer.





Laurence Wood, Ph.D.
Assistant professor, School of Pharmacy

Joined TTUHSC this spring from the University of Pennsylvania where he completed his post-doctoral training in cancer immunology and immunotherapy. His research focuses on the ISG15 pathway and its role in regulating immunity, formation of tumors and tumor immunosuppression.

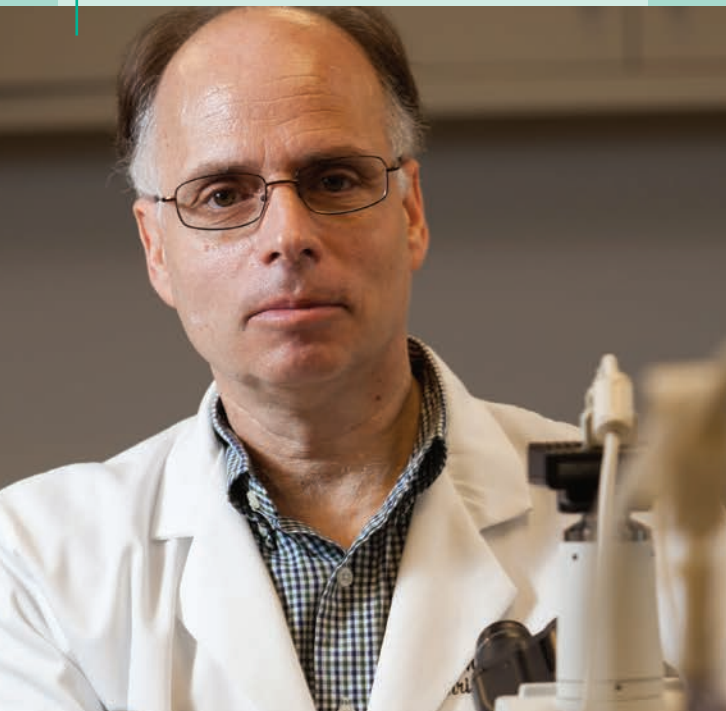


Magdelana Karbowiczek, M.D., Ph.D.
Associate professor, School of Pharmacy

Joined TTUHSC in 2010 from Fox Chase Cancer Center in Philadelphia where she completed post-doctoral training. Her research focuses on the molecular pathways in cell biology cancer, investigating the triggers for cell fate. She received a grant in November from the Cancer Prevention Research Institute of Texas.

Mark Lyte, Ph.D., M.S., MT (ASCP)
Professor, School of Pharmacy

Joined TTUHSC in 2005 and relocated this spring from the School of Pharmacy at Lubbock. His research focuses on affecting growth rates and production of bacteria and has been supported by the National Institutes of Health. Lyte established a field of microbial endocrinology.



“... we can begin to think of Abilene as an integrated environment where we have a very interactive mix of academia and industry.”

...continued from page 14

research scientist and deputy director at the institute to develop a life sciences industry model to implement in Abilene.

“They work around the globe basically looking at technologies and companies, and they can bring them in throughout the world or the United States,” Weidanz said. “We are well on our way to having this global reach now as well with a focus on immunology and immunotherapeutic products.”

Weidanz believed so strongly in this opportunity that he moved in 2007 from the School of Pharmacy at Amarillo to Abilene, bringing along his company, Receptor Logic, the school’s first commercialized research venture. He then relocated the company to the Abilene Life Sciences Accelerator. The 22,000 square-foot facility offers a state-of-the-art laboratory for research initiatives and a vivarium and provides support services such as business assistants and lab technicians. Emergent Technologies, a venture capitalist group focused on funding commercialization of life sciences research, manages the accelerator under an agreement with the DCOA. Currently, Receptor Logic and Enavil, both operating under the Emergent Technologies Inc., umbrella, are the only tenants.

Startups such as these, Weidanz explained, need the business support from companies such as Emergent Technologies, but they also need researchers and a skilled labor force — both available now through academic support at local universities. Those in the graduate biotechnology program at TTUHSC will receive classical research training, preparing them for further academic research, but they also will have the opportunity to learn about commercial research through internships with start-ups, including those at the accelerator, Weidanz said.

In addition, local universities have created a pipeline to the new graduate program as well as established training programs for skilled labor work force. Abilene Independent School District has the Academy of Technology, Engineering, Math and Science, a T-STEM school and a medical magnet program at Hardin Simmons University; McMurry University has an undergraduate biomedical degree program; and Cisco College offers a biotechnology technician certificate program — all of which began in the past five years.

Weidanz said several McMurry students have interned at Receptor Logic, which has developed three products — therapeutic antibodies, assay services and immunology reagents — based on Weidanz’s initial research on T-cell receptor technology.

“Receptor has been an anchor company for what we are trying to do here in Abilene, which is to build another component in the biotech industry — an entrepreneur side of things.”

“I think what they are doing is interesting, and they are going about it in a very compelling way. I applaud their efforts,” said Douglas Stocco, Ph.D., TTUHSC executive vice president for research, GSBS dean, and professor of biochemistry and molecular biology. With a background in corporate research as well as academia and entrepreneurship, Weidanz brings an understanding as well as real working knowledge to the equation, Stocco said.

Upon completion of his graduate work, Weidanz chose an industry job over a coveted post-doctoral research opportunity, which brought chagrins not only from his Ph.D. department chair, but also from Weidanz’s father, an NIH researcher himself. By the time Weidanz arrived at TTUHSC in 2000 to join the School of Pharmacy, he had a successful career as a research scientist at Baxter Diagnostics and developed Sunol Molecular Corporation, where he created and managed the T-cell receptor technology.

Having that experience in academic and corporate learning environments gives a researcher the best of both worlds, Weidanz said.

“I think that we are making a big mistake if our goal (as faculty) is to just have students in our labs to do the work that we have done and train them in the way we were trained. If our goal is to just create more Ph.D.s, I don’t know that’s really doing justice for the students.

“Instead, I really hope we can begin to think of Abilene as an integrated environment where we have a very interactive mix of academia and industry.

“It’s important for faculty recruitment and retention and economic development as a whole. These communities that are successful in doing this are bringing good paying jobs, new educational programs ... it’s a whole new sort of dream come true.”





“These communities that are successful in doing this are bringing good paying jobs, new educational programs ... it’s a whole new sort of dream come true.”

A TOOL FOR THE TRADE

After using an assessment tool developed by School of Nursing professor Alyce Ashcraft, Ph.D., CNE, R.N., those working in skilled nursing positions say they felt better prepared to convey the patient's condition to the doctor, nurse practitioner or physician assistant.

Ashcraft identified key information that providers use when making decisions about their patients health status. When that information is not presented in a comprehensive manner, the provider may err on the side of caution and send the patient to the emergency department, she said. Hospitalization rates for older adults in nursing homes range from 9 percent to 59 percent and more than half of those are avoidable if the provider has a comprehensive picture of the patient's health status, Ashcraft said.

The form utilized in the study provides a checklist to guide nurses, regardless of their experience, through the process of gathering and reporting key health status information in a more concise manner. This process, said Ashcraft, would allow the provider to make a better assessment regarding the need to transfer a patient or provide treatment at his or her place of residence.

"We are not saying don't send them to the hospital," she said. "But instead, let's see if they really need to go or if they can be cared for in their place of residence."

Moving an elderly person from his or her place of familiarity can contribute to physiological changes and that can negatively impact their functional abilities, she said. Additionally, using the hospital emergency department for tertiary care overburdens an already financially strapped health care system.

The study, funded by a private grant awarded to the School of Nursing and with support from Carillon Inc. in Lubbock, is being expanded in a second study to an electronic format in an attempt to streamline its use. An electronic format, Ashcraft said, could possibly make the information more readily available to other health care providers, such as the ambulance driver and the hospital's triage team, should a person need to be transferred for care.



SILENCING THE O

Ovarian cancer is often called the silent cancer because there are rarely no symptoms until the disease has progressed to late stages and survival rates are minimal. The results of a recent study are giving women diagnosed with the disease new hope.

Sanjay K. Srivastava, Ph.D., professor of cancer biology in Department of Biomedical Sciences at TTUHSC at Amarillo and Prabodh K. Kandala, Ph.D. student, discovered that diindolylmethane, or DIM, an anti-cancer drug known to inhibit the growth of ovarian cancer cells in laboratory studies, also has the ability to kill ovarian cancer by preventing cell invasion and angiogenesis.

As an added bonus, the researchers learned that DIM also increases the efficiency of cisplatin, one of the more common platinum chemotherapy drugs. When given together, the drugs suppressed tumor growth in mice by an additional 50 percent as compared to the chemotherapy drug alone.

Their research was published earlier this year in *BMC Medicine*, the flagship journal of BioMed Central, accessible at <http://tinyurl.com/bvxehzr>.

IMPROVING HEALTH OF MOM AND BABY

In a first-of-its kind study looking at the incidence of non-alcoholic fatty liver disease (NAFLD) in pregnant women, a team of researchers from the School of Medicine's departments of Obstetrics and Gynecology at the Permian Basin and Amarillo discovered a higher incidence than among the general population.

Results indicate 50 percent of the women in the study, regardless of their pregnancy stage, weight or diagnosis of gestational diabetes — factors that influence susceptibility — had ultrasound evidence of NAFLD.

The disease, a buildup of extra fat in the liver cells primarily triggered by obesity and diabetes, is the most common cause of liver disease among Americans. In its earliest stages, the disease is benign; however left untreated it can lead to cirrhosis, liver cancer or even liver failure. NAFLD is prevalent in 20 percent to 40 percent of the general population, but more than doubles in those who are morbidly obese.

"There is growing evidence in the literature of a relationship between pregnant women who have NAFLD and obesity in childhood, but this is the first to report on the incidence of NAFLD in pregnant women," said Daniel Castracane, Ph.D., director of clinical research for the School of Medicine at the Permian Basin. Christopher Maguire, D.O., assistant professor of obstetrics and gynecology at the Permian Basin, and Robert Kauffman, M.D., regional chair and professor of the department at Amarillo, and members of the clinical research staff were instrumental in the study.

"We are very interested in following women who show high incidence of NAFLD and their children to look at long-term effects; do the children develop the disease and is this what triggers obesity and possibly Type 2 diabetes?" Castracane said.

These factors are of concern given the high number of overweight and obese pregnant women in the region who do not seek prenatal care until later in their pregnancies, he said. Excess weight puts pregnant women at higher risk for gestational diabetes, and, in particular, for Type 2 diabetes and obesity after delivery.

Castracane presented the findings recently at the International Congress of Endocrinology in Florence, Italy. It is the first of several studies on obesity and pregnancy being conducted in the department.



POTENTIAL POWER OF A PROTEIN

Spinal muscular atrophy is a genetic neuromuscular disease characterized by muscle atrophy and weakness. It is one of the most common rare diseases, believed to affect up to 25,000 children and adults in the United States and about 7.5 million Americans are carriers. The disease generally manifests early in life and is the leading genetic cause of death in infants and toddlers.

Earlier research by Laxman Gangwani, M.Tech., Ph.D., in the field of muscular atrophy identified the requirement of zinc finger protein 1 (ZPR1) as a key component of the survival motor neuron protein, which is either missing or a genetic mutation in individuals with the disease.

His recent work, however, adds to his discovery. In animal models, Gangwani, an associate professor in the Center of Excellence in Neurosciences, Department of Biomedical Sciences at the Paul L. Foster School of Medicine, identified ZPR1 as a possible modifier in spinal muscular atrophy, making it a potential therapeutic target for treating spinal muscular atrophy.

Gangwani's work was published this spring in *Quest*, the Muscular Dystrophy Association's magazine (<http://tinyurl.com/7pzuom8>), as well as featured on Families of Spinal Muscular Atrophy website (<http://tinyurl.com/7fh2qt6>).

POTS

WINNING THE BATTLE WITHIN

BY HOLLY KITTEN

The Paul L. Foster School of Medicine, along with medical schools nationwide, has joined the White House initiative to support America's military families, specifically promising to develop new research and clinical trials on post-traumatic stress disorder and traumatic brain injury.





Jake Bundy takes his shift as tower guard at Camp Bucca, Iraq.

Jake Bundy remembers being in the medical hold. It was 2005, and he was at Fort Carson, Colo., after injuring his back in training while manning a .50-caliber machine gun in the turret of an ammunition carrier.

With two bulged discs and bilateral spondylolysis of the lumbar spine, Bundy was sent from Camp Shelby, Miss., to Fort Carson to receive treatment while the rest of the National Guard's 222nd field artillery unit finished the last two months of training and deployed to Iraq.

Lying there, Bundy said he felt ashamed. "I went through some really dark times with myself because I felt like I was abandoning my troops."

There also were other soldiers in the medical facility with him who were in worse shape, he said, some who were really messed up with serious injuries.

Eventually, Bundy was released; he returned home to St. George, Utah, and slowly began the recovery process. Still feeling overwhelmed with stress and guilt, he began to experience other problems.

"When I got home," he said, "I immediately started having night hallucinations, getting up and running around, saying that there's a bomb, and stuff like that."

Bundy said he felt foolish admitting to his nightmares. What would his comrades say about the hallucinations? After all, he had not seen war; he had not even experienced anything traumatic in training. So, with the exception of his wife, he kept his thoughts to himself, figuring he could deal with them on his own.

I used to have to put all my energy into smiling for other people. When I got home, I didn't have anything left to give my family.

After fully recovering from his back injury, Bundy moved with his wife to Logan, Utah, to attend Utah State University, having initially joined the National Guard for college financial assistance. Ironically, the National Guard was the reason he had to put his education on hold again in 2007 when he deployed with the 145th field artillery unit to Camp Bucca, Iraq, near the border of Kuwait.

There, one of Bundy's main jobs was tower guard duty at the internment camp the unit was managing. Each workday was 12 to 14 hours, with one day off every two weeks. There were times when the camp was still and quiet, but there were also times when it was filled with rockets and riots.

When Bundy returned stateside a year later, not only was he faced with the transition from full-time soldier to full-time husband and father, but he also continued to wrestle with the nightmares and hallucinations. The transition was just as challenging for his wife, he said. In a matter of days, the routine she had built life around as a single mother of three children became obsolete.

"It was really difficult because we were gone from each other for so long," he said. "We became almost different people."

As Bundy and his wife began to reconnect their new lives together, a part of him couldn't move past the trauma of war. He still suffered from hallucinations at night and remembers the nightmare of mistaking a pair of pants on the bed as a body part and a frame on the wall as a rocket.

The stress only increased during the day as he started back to school – this time at Texas Tech in preparation for a career in occupational therapy. Each morning, he would put on what he called his fake Jake face in an effort to hide his inner turmoil and fatigue, but he could only hold that face for so long each day.

"I used to have to put all my energy into smiling for other people," he said, "When I got home, I didn't have anything left to give my family."

Finally, in 2011, Bundy let down his guard. As he became better educated in his classes about health care, he realized it was unwise to avoid getting help. So, he went to the Texas Tech Veterans Association and was officially diagnosed with post-traumatic stress disorder, or PTSD.

The stress reactions of PTSD include nightmares, flashbacks, difficulty sleeping and feeling detached. According to the Department of Veterans Affairs, experts estimate PTSD occurs in 11 percent to 20 percent of the veterans of the Iraq and Afghanistan wars.

"I never thought that I could have PTSD," Bundy said. "I don't know exactly why it all happened. I think it was the med hold."

Experiences like Bundy's are what encouraged first lady Michelle Obama and Jill Biden, wife of Vice President Joe Biden, to create the Joining Forces Initiative. According to the organization's website (www.whitehouse.gov/joiningforces), the initiative launched this spring aims to raise awareness of the unique needs of America's military families in areas of employment, education and wellness.

Nationally, 130 medical schools and research facilities have promised to develop new research and clinical trials on PTSD and traumatic brain injury. The Paul L. Foster School of Medicine is one of seven medical schools in Texas to pledge their commitment to improve the health care needs of veterans through education, service and research.

Assisting veterans is not a new venture for the Paul L. Foster School of Medicine. For more than 35 years, TTUHSC medical students have participated in clinical rotations through the William Beaumont Army Medical Center and the El Paso Veterans Affairs Clinic and have been involved in learning about the needs of Department of Defense personnel and their families. The medical center is located in El Paso at Fort Bliss, one of the country's largest military bases.

Now, through a research initiative led by Michael Escamilla, Ph.D., department chair of psychiatry at the Paul L. Foster School of Medicine, there will be assessments of the cognitive abilities of soldiers before they are deployed and after they are deployed, in hopes of identifying environmental and genetic factors that contribute to PTSD.

Escamilla has also developed programs in recent years to assist veterans of war who suffer from PTSD and related conditions.

Paul L. Foster School of Medicine Founding Dean Jose Manuel de la Rosa, M.D., (SOM '84) said as part of the initiative the school will also be adding modules to the curriculum that address the special care needs of children of active duty personnel and veterans, as well as the special care needs of veterans with traumatic brain injuries.

"We want our doctors to graduate with those skills and to understand those special needs," he said. "We will be able to gain knowledge from our involvement and at the same time serve our military personnel."

There are some very emotional things about the war...We see people that are dead and dying every single day. I'll never forget it.



John Kennedy Bini, M.D., (SOM '99), at right, during surgery in Bagram, Afghanistan.

As a surgeon who served two tours in Iraq and one in Afghanistan, John Kennedy Bini M.D., (SOM '99), said the medical environment in a war can be very traumatizing.

“There are some very emotional things about the war,” Bini said. “It’s not the TV emotional thing of ‘I got in a fight with my girlfriend, the nurse.’ It’s real life. It’s real death. We see people that are dead and dying every single day. I’ll never forget it.”

Bini, a trauma surgeon and general surgeon at Wilford Hall Medical Center at Lackland Air Force Base in San Antonio, said it takes quick thinking to perform well as a deployed doctor. There are limited resources, limited beds, limited hospital personnel and limited time. When U.S. casualties came in, the goal was to take care of the patients just enough to ensure them a safe trip to a better-equipped hospital in Germany.

For doctors and nurses who are used to constantly monitoring a patient until he/she is fully healed, letting go can be hard.

“You have to use a great amount of restraint when it comes to deciding, not what you can do but what you should do in a limited environment,” he said. “That’s a big challenge for extremely talented, strong ego, skilled, super intelligent folks who really are on top of their game. They want to fix everything.”

As the trauma czar, Bini said he implemented a strict program under the Air Force guidelines. But even he had to fight back the tears some days.

One of those moments was when President Obama made an unpublicized visit to their



John Kennedy Bini, M.D., (SOM '99) says goodbye to an 8-year-old Afghan girl during her discharge from the hospital.

hospital in Bagram, Afghanistan, during the spring of 2010 to award Purple Hearts; Bini took the president around the hospital and gave a clinical synopsis of each patient that was to be awarded a medal.

Then, they entered the ICU. There was a soldier lying on a bed, who Bini said was severely injured and very sick. He had bi-lateral lower extremity amputations and a pelvic fracture. One of his upper extremities was amputated as well. The hand that remained on the other side was partially amputated. His abdomen was packed open.

Bini said he watched as the president, who was visibly choked up, presented the soldier with his Purple Heart, thanking him on behalf of the nation for his service.

“For me, that was extremely emotional,” Bini said. “That’s something that’s part of me now.”

And explaining that part of himself to his friends and family was difficult when he returned from war, Bini said.

“They don’t get it,” he said, “and they never will. I’m thankful they don’t have to get it. I really am. You don’t forget what you’ve seen over there. There’s nothing that ever makes it go away. You live life.”

Honestly, I know this is cliché, but if you go get some help, it will change your life. I’m a firm believer now. I feel like I can go throughout the whole day as myself.



MIAMI HERALD

Jake Bundy can now balance all of his responsibilities — husband, father, student — without the shadow of PTSD.

Bundy has reached the same conclusion. Now, as a father of four, he stays very busy. He is beginning his third year in the School of Allied Health Sciences occupational therapy program, works part-time at UMC Health System, coaches the baseball team his two sons play on, and competes on the Texas Tech Water Polo team, which placed seventh at nationals last November. And despite all the stresses of deployment, the Bundys have remained steadfast in their eight-year marriage.

He rarely experiences nightmares anymore after he began taking antidepressants prescribed by the VA physician. At first, Bundy said he was hesitant to take any drugs for his PTSD, but changed his mind when the doctor allowed him to be on the lowest dosage of the prescription. Even that smallest amount, he said, has made all the difference.

However, Bundy said the best therapy for him is simply talking about his deployments and how they have changed his life.

“My experiences are invaluable to me,” he said. “They have given me the ability to sympathize with people.”

Looking back, Bundy said he wishes there would have been more awareness about what it is like to return home as a veteran. He hopes the Joining Forces Initiative will succeed in better informing any U.S. soldier about post-war life.

“The more awareness, the better,” Bundy said. “Deploying changes your whole life. The way you think, the way you feel, the way you react, the way you see life.”

“Honestly, I know this is cliché, but if you go get some help, it will change your life. I’m a firm believer now. I feel like I can go throughout the whole day as myself.”

For Bundy, Fake Jake is gone for good.

MISSION

by danette baker



ACCOMPLISHED

“They say you know when it’s time to retire, and it’s time.”

There is a certain matter-of-factness about the way School of Allied Health Sciences Dean Paul P. Brooke Jr., Ph.D., FACHE, says that he’s retiring. No waxing poetic. No fall-d-rah.

Perhaps that’s the fallout of 28 years in the military, where moving on is a way of life. *As soon as you come to an organization, you know you are not going to stay indefinitely and so the movement out of an organization is part of the job, he says.*

Perhaps it’s the very realization that time is passing swiftly, and as you get older the more important other parts of life become. He’s missed a lot of significant family events. The most recent example occurred last month when his son graduated from Georgetown University with his master’s degree the same day as TTUHSC held convocation and graduation ceremonies. *It’s time to spend some time doing things I really want to do, he says, which are getting to know my grandkids, doing some travelling and spending time with my wife before we are too old to enjoy the trips.*

Moreover, it’s knowing that you have accomplished the mission set before you and now your job is to step aside and let someone else lead the next charge.

When Brooke, a retired Army colonel, became School of Allied Health Sciences dean in 1998, his goal was to grow the school’s academic programs and enrollment, both which have been achieved. In the past 14 years, the school has expanded its programs from five to 18 and its enrollment from 450 to more than 1,300. To support growth in the depth and quality of programs, the school enacted a faculty development program, under which 37 to date have earned terminal degrees. The latter is something Brooke counts among the most significant accomplishments during his tenure. The school now ranks in the top tier of graduate programs and student enrollment nationwide and has reached a milestone with the awarding of its first NIH research grant.

Accomplishments then have not come by chance, but instead through a very purposeful structure of accountability that Brooke calls an

DEAN PAUL BROOKE’S CAREER HIGHLIGHTS

School of Allied Health Sciences
Dean, 1998-2012

School of Allied Health Sciences Regional
Dean at Odessa, 1994-1996

U.S. Army, retired in 1994 with rank of colonel.
His military assignments included:

Command positions in Vietnam, Fort Riley,
Kansas, and Nürnberg, Germany

Policy analyst in the Office of the Army’s
Surgeon General

Hospital administrator in two U.S. Army
hospitals in Germany

Dean of the Academy of Health Sciences at
Fort Sam Houston

FAMILY:

Married 45 years to Barbara Brooke

Three children

Seven grandchildren

NEW FACES IN LEADERSHIP ACROSS TTUHSC

ROBIN SATTERWHITE, ED.D., FACHE, SCHOOL OF ALLIED HEALTH SCIENCES DEAN

Robin Satterwhite, Ed.D., FACHE, has been named dean of the School of Allied Health Sciences. He previously served the school as associate dean for Learning Outcomes and Technologies and as associate professor and chair of the departments of Clinic Administration and Rehabilitation Counseling. He assumed the dean's position July 1. Satterwhite joined TTUHSC in January 1999 as regional dean at the Permian Basin.



GARY VENTOLINI, M.D., SCHOOL OF MEDICINE REGIONAL DEAN AT THE PERMIAN BASIN

Gary Ventolini, M.D., has been named the Regional Dean, School of Medicine at the Permian Basin. He previously served as chair of the Department of Obstetrics and Gynecology at the Wright State University Boonshoft School of Medicine. He is board certified in family medicine and obstetrics and gynecology and has received recognition and numerous awards for his career in teaching and service. Additionally, his scholarly work includes a long list of publications and presentations and he has served as principal investigator for several translational research grants. Ventolini joined TTUHSC in May, replacing John Jennings, M.D., who accepted a national leadership role with the American College of Obstetricians and Gynecologists.



empowered leadership team. Participation from members is not just permitted or allowed, but rather is required. His role, as an empowering leader, was to enable and reward risk-taking. *I'd say my contribution to this whole thing was creating the climate and creating a demand for creativity and then allowing folks to take reasonable risks where we don't keep score and where people were not subject to embarrassment if they came out with an idea they thought the rest of the group would laugh at.*

The school has, in essence, grown up — to use an analogy Brooke weaves throughout conversation — and is ready to engage the next stage of its life cycle. And, Brooke is ready to move on too. He quotes Peter Drucker [an influential writer and management consultant] who says good executives, like good parents, develop competent orphans. *Good leaders have a succession plan as well as a business plan. The best mark of a leader, it's been said, and I subscribe to this, is to see how the organization is doing six months or a year after that leader is gone.*

When he closes the door to his offices on the second floor for the last time, Brooke says he'll leave with confidence knowing he's completed his mission. And as with any parent who's watched as his or her child matures and moves on, there will be a certain sadness he says. *This has been the longest job I've ever held, and it's been in all honesty, the most rewarding. I've been blessed by the opportunities that Texas Tech has afforded me to have a very fulfilling second career. My defining career, as you may know, was as an Army officer. I came to the job knowing that there is a term limit on all human endeavors, and so I used to say I came out [to TTUHSC] to see what would happen if I put all of the things I had learned in my military experiences into practice. In all due modesty, it seems to have worked out pretty well.*

Brooke and his wife, Barbara, plan to retire in Lubbock. Originally from New York City, he says, they have developed a deep affection for Texas Tech and West Texas.

READ MORE OF THIS INTERVIEW IN PULSE ONLINE.





Alumni

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Friday night life

On the sidelines at a high school football game, Natalie Steadman, M.A.T., (SOAHS '92) found herself in situation she had prepared for her entire career, and one she prayed would never happen.



ARTIE LIMMER

Key play

By Allison Wood

Sideline save reinforces Steadman's canons of practice, preparation

Like the athletes she is there to care for, Natalie Steadman, M.A.T., (SOAHS '92) has her own Friday night pre-game warm-up. As part of that, she offers a prayer for the players' safety and pictures herself responding to an emergency — oftentimes imagining the worst-case scenario.

"You can't ever prepare enough," she said. "Smack dab in the middle of a game, things can happen in an instant, you have to be prepared to make a quick decision."

Last fall, her 20 years of preparation came into play as Steadman rendered sideline aid not to a student athlete but to photographer Larry Martinez.

Steadman, a professor in the School of Allied Health Sciences Master's of Athletic Training program, has through an outreach program, served for the past three years as athletic trainer at Petersburg ISD, a rural school district located about 30 miles northeast of Lubbock.

"I love that it is so much about community and about the kids in high school sports. It is about a service and it is what I really love to do."

On that Friday night, as the game clock ticked down to the final minutes, "everyone started yelling my name," Steadman said. "I look over, and it was one of the worst pictures ever in my head. (Martinez) was face down on the ground, and upon turning him over, I saw he was in respiratory distress. I called for the AED (automated external defibrillator), which was about 10 yards away, cut his shirt off, and then just remembered it being literally dropped in my lap. I got the pads placed on his chest about the time the EMS got the ambulance over and saw the AED analysis: shock advised."

The play Steadman had prepared for her entire career was over in less than five minutes but it was one she will likely never forget.

"That image ... 'Boom!' His body was lifted up off the ground," she said. "I then started CPR on his chest and EMS was doing breathing. I saw a flicker of an eyelid; he began to sputter and breathe. He was confused, but he could speak."

Steadman has always been a believer in the practice-makes-perfect model. She encourages her students to volunteer at community events, such as the annual Buffalo Springs Ironman. She participated in the

TTUHSC Distinguished Alumni Honorees

The schools of Allied Health Sciences, Medicine, Pharmacy and the Graduate School of Biomedical Sciences recognized accomplishments of alumni with the highest honor – the Distinguished Alumni Award. The School of Nursing honorees were presented in the fall and included in the Winter 2012 issue of PULSE. Since 1999, the schools in conjunction with the Office of Alumni Relations have presented awards of achievement and/or service to individuals nominated by their peers.

Graduate School of Biomedical Sciences

Distinguished Alumnus
Doctorate of Philosophy Degree
Ralph Lydic, Ph.D., ('79)

School of Medicine
Distinguished Alumnus
Research Scientist
Dale Stovall, M.D., ('85)

Distinguished Alumnus
Rodney Young, M.D., ('97)

School of Pharmacy

Distinguished Alumnus
Pharmacy Research
Sachin Shah, Pharm.D., ('00)

Distinguished Alumna
Pharmacy Leadership
Rebecca Sleeper, Pharm.D., (Resident '99)

School of Allied Health Sciences

Distinguished Alumnus
Department of Rehabilitation Sciences
Shaun Fant, O.T., ('92)

Distinguished Alumna
Department of Speech, Language and Hearing Sciences
Jennifer Hanners, M.S., CCC-SLP, ('94, '96)

Distinguished Alumnus
Department of Laboratory Sciences and Primary Care
Jim Jankowski, MT (ASCP), M. Ed., MPAS, PA-C, ('06)

Distinguished Alumnus
Department of Clinic Administration and Rehabilitation Counseling
Maj. Timothy Morris ('10)

event until a diagnosis of multiple sclerosis sidelined her several years ago. Since then, she has led the event's medical team of about 75 volunteers.

"On a good year, an event like this is worrisome because it takes a lot of preparation to compete. Their bodies are stressed, and it is difficult for them to think clearly and pull themselves out of the competition if necessary.

With extreme conditions, like last summer's 112-degree weather, there is a real possibility of something catastrophic happening. Steadman said.

Such are the experiences she shares with her students to convey a lesson – either about what they are learning in class or about life in general. She describes herself as a storyteller using real life examples as her literature.

That Friday night will inevitably become one of the stories.

Betty Braly Crager died March 22, 2012. She joined the School of Nursing in 1983 as a faculty member and later served the school as student services advisor and administrative assistant until her retirement in 1995.

Ana Maria Carrasco died Dec. 21, 2011. She worked 30 years for TTUHSC at El Paso, retiring from Texas Tech Physicians Medical Income Practice Plan. To honor her, the MPIP office joined with the TTUHSC Office of Development, to establish the Ana Maria Carrasco Nursing Scholarship.

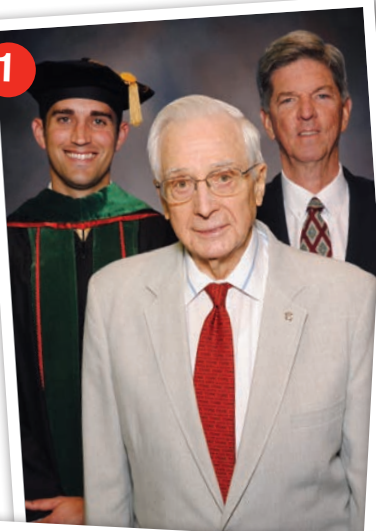
David Craig Waagner, M.D., (SOM '84, Resident '87) died April 17, 2012. He was professor of pediatrics from 2003 until his retirement in 2005, having joined TTUHSC in 1991 as assistant professor and chief of the Division of Pediatric Infectious Diseases. The David Waagner, M.D., Memorial Gifts fund has been established in his honor through the TTUHSC Department of Pediatrics.

Gifts in memory of or in honor of are routed to the desired location of the donor through the TTUHSC Office of Institutional Advancement, 3601 Fourth Street, Stop 6238, Lubbock, Texas 79430.

alumni

ROUNDS

1



2



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4



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1 Bill McCunniff (SOM '12), and Jim Hutson, Ph.D., associate vice president for research and professor in the Department of Cell Biology and Biochemistry, received the John Aure Buessler Ph.B., M.D., M.S., (Business Administration) Medical School Founding Dean, Memorial Fund Endowment Awards for their student and teacher excellence, respectively. The awards, presented during TTUHSC commencement, were established by Catherine Anne Hansen Buessler to honor her husband and to promote and encourage excellence at all levels of teaching, research, learning and critical care in the art and science of medicine. The School of Medicine and TTUHSC were established under Buessler's leadership. Faculty members select the student award recipient, and medical students select the faculty award honoree. **2** Traci Metting, Pharm.D., (SOP '00) and other School of Pharmacy alumni, faculty, students and staff in Dallas recognized the contributions made by Dean Arthur Nelson Jr., R.Ph., Ph.D., during his tenure with the school. Nelson will leave the dean's position this summer, but remain on the school's faculty. **3** Darlene Norton, R.N., M.S., A.N.P., pictured with her husband, Bill Norton, and Yondell Masten, Ph.D., R.N., professor and associate dean, was among the donors recognized at the Anita Thigpen Perry School of Nursing's annual appreciation event for nurse practitioners and preceptors. Norton, professor emeritus, helped establish an endowed scholarship for those seeking an advanced degree. Masten also was recognized for her service to the school as interim dean. **4** Nursing students had the opportunity to thank donors in April during the school's annual donor appreciation luncheon. Pictured, from left, Amanda Puckett, Second Degree Web-Based BSN, recipient of the Helene Fuld Health Trust Endowed Scholarship; Gregory Curry, Second Degree Web-Based BSN, Dr. H.G. and Olive Parker Scholarship Endowment in Nursing; Elizabeth Tombs, R.N., M.S.N., instructor in the School of Nursing/representative for Sigma Theta International Tau Iota Mu Chapter; and Mallory Dyess, Second Degree Web-Based BSN, Robert Wood Johnson Foundation New Careers in Nursing Scholarship Program. **5** Medical student scholarship recipients and Executive Vice President and Provost and School of Medicine Dean Steven L. Berk, M.D., give a big Texas Tech "Thank You!" to donors. Back row, from left, Clay Buchanan, Charles Willnauer, Berk, Seth Wilhelm, Robert Cooper, Jaden Evans; front row, from left, Keeley Ewing-Bramblett and Tiffany Bunag.

ALUMNI PROFILE :: pharmacy

Jessica Njoku, Pharm.D., ('08)

INFECTIOUS DISEASES/ANTIMICROBIAL
STEWARDSHIP COORDINATOR, BAYLOR UNIVERSITY
MEDICAL CENTER, DALLAS, TEXAS

HEALTH MATTERS

BY MARK HENDRICKS

For JESSICA NJOKU, PHARM.D., pharmacy school may have inspired a possible second career.

"I am an exercise junkie; I go to the gym four to five times a week," Njoku said. "That is one habit I formed in pharmacy school, and I have even contemplated becoming a fitness instructor, but that is on hold for now."

Despite her penchant for workouts, it is through Njoku's position as infectious diseases/antimicrobial stewardship coordinator at Baylor University Medical Center in Dallas that she is helping patients improve their own health. Njoku defines antimicrobial stewardship as rationally and systematically using antimicrobial agents to achieve optimal outcomes.

"This means using the correct agent at the proper dose for the appropriate duration to cure or prevent infection, all while minimizing toxicity and the emergence of resistance," she said. "Antimicrobial resistance costs money, livelihood and lives and threatens to undermine the effectiveness of health delivery programs. The prevailing causes of antimicrobial resistance have been the overuse and misuse of antimicrobial agents."

Njoku made the decision to pursue such a specialized practice area during her time as a pharmacy student at TTUHSC.

"Although I enjoyed all of the courses, the one that stood out to me was infectious diseases," she said. "I wanted a career that would allow me to give back to my community in Nigeria."

After receiving her degree and completing a first-year post-graduate residency in pharmacy practice at TTUHSC at Lubbock, Njoku embarked on a two-year fellowship in infectious diseases/antimicrobial stewardship at the University of Nebraska Medical Center in Omaha. She also enrolled in the school's public health program and expects to graduate in December with a master's degree in public health biostatistics. Njoku received offers for fellowships in other infectious diseases sub-specialties such as pharmacokinetics and HIV/AIDS, but credits Charles Seifert, Pharm.D., regional dean at the School of Pharmacy at Lubbock and her residency director, for helping her select a practice specialty.

"I wanted a specialty that would allow me to use inpatient clinical skills and provide an opportunity to implement drug policies that promote the use of evidenced-based knowledge consistent with safe and effective medication," Njoku said. "I hope to improve clinical care and outcomes for patients on a broader scale."

So while it may be several years before Njoku is leading workouts at the gym, she's already dedicated to improving health.

ALUMNI PROFILE :: allied health sciences

Brenda Bryson, M.P.T., L.M.T., ('97)OWNER, MONARCH PHYSICAL THERAPY
BOERNE, TEXAS**THERAPEUTIC TOUCH**

BY ALLISON WOOD

“The cycle of a monarch butterfly is one of transformation,” said BRENDA BRYSON, M.P.T., L.M.T., as she explains the name she chose for her practice. Monarch Physical Therapy in Boerne, Texas, is a place for patients to be transformed from a life of pain and where Bryson’s transformation began with her own career.

Bryson was in the first graduating class for the master’s degree in physical therapy. “I got a great base of anatomy and physiology. It was a good class of people, and I came away with a great sense of how to problem solve,” she said of her time at TTUHSC. “As a provider, I keep building on that base.”

After working in other physical therapy practices, Bryson decided to open her own clinic. “I never pictured myself as a business owner, but everything has led me to this direction,” she said. She added a licensed massage therapist certification to her credentials and uses a technique called myofascial release to treat patients at her growing practice, which is located 40 miles from her hometown of Fredericksburg, Texas. She has had great success with patients who suffer from fibromyalgia, post-trauma stress, incontinence and scar tissue.

“It gives me a full hour of hands on therapy with my patients providing consistent pressure to an area,” Bryson said of the technique that focuses on the soft, connective tissues, which she describes as the shock absorbers for the body.

“I often hear that I’m the end of the trail for a patient. Hurting is hard on your personality, and seeing a patient becoming a happy person again is so fun.”



ALUMNI PROFILE :: **biomedical sciences****Trevor Brasel, Ph.D., ('04)**

STUDY DIRECTOR, REGULATED STUDIES,
UNIVERSITY OF TEXAS MEDICAL BRANCH
GALVESTON, TEXAS

ON THE EXHALE

BY HOLLY KITTEN

TREVOR BRASEL, PH.D., knows a lot about indoor air quality.

But as for the air in Galveston, Texas? Well, he is still getting used to that.

“Obviously, I have to get used to the humidity and the mosquitoes,” he said with a laugh.

After studying bioaerosols for seven years at Lovelace Respiratory Research Institute in Albuquerque, N.M., Brasel moved south in February and began a new job at the University of Texas Medical Branch (UTMB) in Galveston. He is the study director for regulated studies at UTMB, where students and faculty are researching emerging infectious and tropical diseases such as Ebola, West Nile virus and influenza.

UTMB added Brasel’s position to its program this year in an effort to build on its extensive basic research program. Regulated research studies like those Brasel will direct are highly technical, but many view these types of studies as instrumental to translating research into licensed vaccines and therapeutics focused on human health.

Working in the well-known Galveston National Laboratory, Brasel said he is excited about directing regulated non-clinical studies. Still, it is no easy task. Performing these types of studies under specialized conditions like those in a biosafety level four containment laboratory is a new avenue for this type of research, not only for UTMB but also for the Food and Drug Administration and the U.S. government.

“It is my goal to make sure the program is successful here,” he said. “When we are able to achieve that goal, it’s going to be a very good accomplishment for the university and me personally.”

Despite these new challenges, Brasel has plenty of lab experience. At Lovelace Respiratory Research Institute, he worked with vaccines and therapeutics against a number of infectious diseases. One year, he even had the opportunity to serve as a visiting scientist between the institute and some of the facilities in the former Soviet Union. There, he worked with other scientists on the production and testing of a personal bioaerosol sampler for use in hazardous occupational settings.

J. Bradley Randleman, M.D., ('98)

ASSOCIATE PROFESSOR OF OPHTHALMOLOGY
AT EMORY UNIVERSITY SCHOOL OF MEDICINE
INTERIM SERVICE DIRECTOR FOR THE
SECTION OF CORNEA, EXTERNAL DISEASE AND
REFRACTIVE SURGERY AT EMORY HEALTHCARE
ATLANTA, GA.

AN EYE FOR SUCCESS

BY HOLLY KITTEN

For J. BRADLEY RANDLEMAN, M.D., combining a childhood enthusiasm for playing sports with a passion for medicine made it only natural to consider a specialty in orthopedics. But in medical school, two classmates turned his attention elsewhere, and their influence has paid off significantly.

As a professor of ophthalmology at Emory University School of Medicine, Randleman finds academic work a satisfying balance between patient care, teaching and research. He loves the opportunity to improve people's vision while simultaneously passing that knowledge on to the residents.

With Emory Eye Center often serving as a referral clinic, Randleman said he does his best to set an example for his students in helping patients find a diagnosis and solution to their eye problems.

"I try to teach other individuals how to sift through things," he said, "and focus on the most important element to be able to answer the patient's questions."

Randleman also sets aside time each week specifically for research, investigating ways to better identify and manage safety issues in refractive surgery. And by serving as the editor in chief for the *Journal of Refractive Surgery*, Randleman gets a firsthand look at refractive surgery research from across the nation. The diversity among the techniques and technology is quite interesting, he said.

ALUMNI PROFILE :: nursing

Yesenia Trevino, M.S.N., B.S.N., ('11, '06)

NURSE PRACTITIONER, SAN MARTIN DE PORRES CLINIC AND KIDS FIRST PEDIATRICS MISSION, TEXAS

CALLED TO SERVE

BY KATE MCCUNIFF

Sometimes people know from a young age what their calling is in life. For YESENIA TREVINO, M.S.N., B.S.N., that was exactly the case. As a child, a nursing career was on the forefront of Trevino's mind when she played with her dolls and later received her certification as a nurse aide during high school.

Her passion to provide care for underserved populations led Trevino to pursue her bachelor's and master's degrees from TTUHSC. "I have a university 20 minutes from my house, but I decided to drive 11 hours to get my education," she said. "I wanted to get an education from the best, and TTUHSC is the best."

Trevino now works in her hometown of Mission, Texas, where she says one of the challenges she faces working in an underserved area is patient compliance with diet, exercise and taking medications as prescribed. She described significant improvements made in one particular patient, who is diabetic and hypertensive, after seeing the

patient over the course of several months.

"I gave her several sample home exercises she could do and ways she could modify her diet without changing it drastically overnight," said Trevino. "It's very rewarding to know patients are doing better and being compliant with their diet and exercise and seeing improvement."

Trevino often makes follow-up calls and enjoys it when patients act surprised that she would take the time to call them. "Having an open door policy with my patients is my greatest hope because we need to know everything that is going on with our patients in order to better serve them."

As a nurse practitioner making a significant impact in the lives of those living in the Rio Grande Valley, it's clear that Trevino has fulfilled a call that led her to nursing from a young age.



Brian K. Mahmood (SOAHS '08), a fourth-year medical student, is the senior advisor for Lubbock Impact/TTUHSC Free Clinic. He is the founding student liaison and one of the clinic's co-founders.

Joy unspeakable

BY BRIAN K. MAHMOOD

On a Wednesday evening in 2009, I hung Rabindranath Tagore's framed quote on the wall at the Lubbock Impact/TTUHSC Free Clinic. It read, "I slept and dreamt that life was joy. I awoke and saw that life was service. I acted and behold, service was joy." I hung it as a reminder to future medical students and physicians of the aspirations and atmosphere that founded the free clinic.

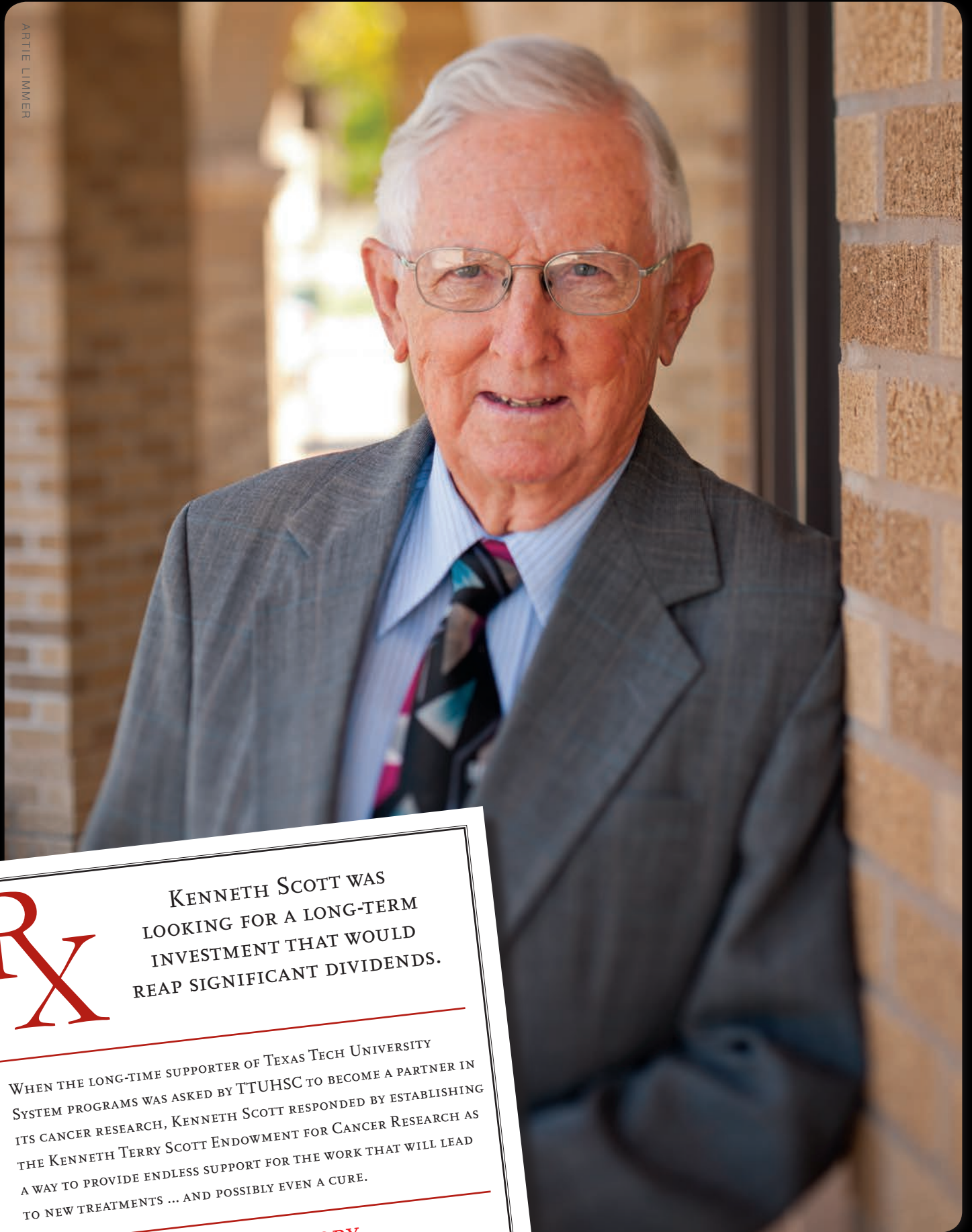
The Lubbock Impact/TTUHSC Free Clinic started in 2007 as a dream of two former medical students, Peter Wu, M.D., (SOM '11) and Sudha Bhadriraju, M.D., (SOM '11), and myself, an undergraduate at the time, who wanted to provide free basic health care to the working poor and indigent population of Lubbock and concomitantly enhance students' preclinical education through service to their community. At the time, there were no completely free clinics in Lubbock and opportunities were limited for the preclinical medical students to use their clinical skills outside of the classroom. We wanted to solve both issues by having a clinic where the students would do everything with the guidance of TTUHSC teaching physicians.

The complete history of the free clinic is longer than I can write about here, and it was more difficult and complicated than any of us ever imagined. We sacrificed a lot to see that it was started and then even more to have it survive the first year.

It was really tough, but it was also really fun. My best memories of medical school are at the free clinic. Being able to help those who need it the most working alongside my classmates and friends while being taught by some of the best physicians in Texas is all I could ever ask for. I saw grateful patients cry, hug the volunteers, and even donate everything they had in their pockets to ensure that others could also receive care. I heard students talk about how much they learned from the physicians and upper level medical students – and beg to volunteer.

The demand to volunteer has always been greater than the number of spots available. Medical students from each class, beginning in 2010, have staffed the clinic, and those graduating this year, began to manage it as well. The volunteers from the Class of 2012 are the ones who kept it alive in 2009, the first full year of operation, so that future medical students could serve the community of Lubbock. Some of them will continue to volunteer as physicians.

Three years and 3,065 patient visits later I recently stood in front of that quote again. This time, simply as a volunteer. I watched as the fourth-generation leadership team smoothly moved patients to rooms. I saw the plans that they have for the future: a pharmacy, which is opening soon; research and demographic studies; more advanced social work; weekly dental clinic; and much more. I saw the medical students and physicians smiling and laughing. I saw them enjoying their time and helping those in the community who need it the most just as we did when we started the clinic. I read the quote again, and I smiled.



Rx

KENNETH SCOTT WAS
LOOKING FOR A LONG-TERM
INVESTMENT THAT WOULD
REAP SIGNIFICANT DIVIDENDS.

WHEN THE LONG-TIME SUPPORTER OF TEXAS TECH UNIVERSITY
SYSTEM PROGRAMS WAS ASKED BY TTUHSC TO BECOME A PARTNER IN
ITS CANCER RESEARCH, KENNETH SCOTT RESPONDED BY ESTABLISHING
THE KENNETH TERRY SCOTT ENDOWMENT FOR CANCER RESEARCH AS
A WAY TO PROVIDE ENDLESS SUPPORT FOR THE WORK THAT WILL LEAD
TO NEW TREATMENTS ... AND POSSIBLY EVEN A CURE.

READ HIS STORY

[AND LEARN HOW YOUR GIFT CAN IMPACT TTUHSC]

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