

UTHSC/UAMS Substance Abuse Mini-Symposium Encourages Collaboration

According to the Center for Disease Control and Prevention, drug overdose is the leading cause of accidental death in the United States. More people died from drug overdoses in 2014 than in any other year on record. Opioids, primarily prescription pain relievers and heroin, are the main drugs associated with overdose deaths. Deaths from drug overdose are up among both men and women, all races, and adults of nearly all ages. With statistics like these, the University of Tennessee Health Science Center (UTHSC) and the University of Arkansas for Medical Sciences (UAMS) see an opportunity to combat this national epidemic together.

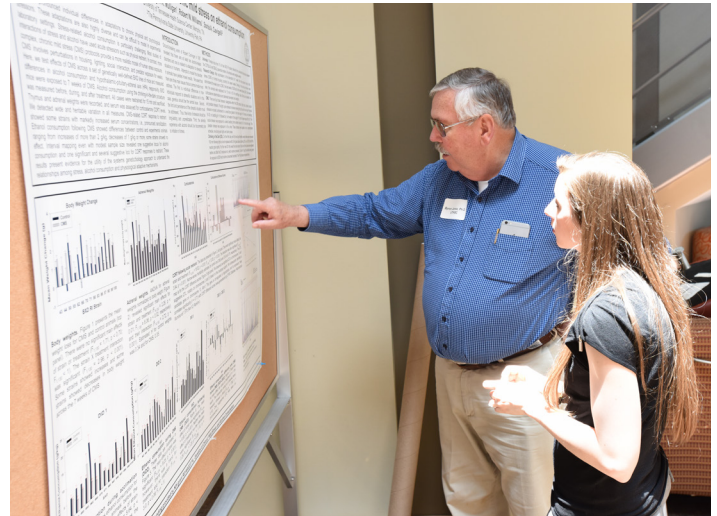
On June 8th, more than 70 researchers from UTHSC and UAMS attended the inaugural Research in Substance Abuse Mini-Symposium. The mini-symposium, hosted by UAMS, was created to foster communication and collaboration between investigators on both campuses. Conceived by Steven R. Goodman, PhD, vice chancellor for Research at UTHSC, and Lawrence Cornett, PhD, vice chancellor for Research at UAMS, the event showcased addiction research being done on both campuses



UTHSC's Steven Goodman, PhD, (left) and UAMS' Lawrence Cornett, PhD (right)

and allowed researchers the opportunity to meet and identify common interests.

The UTHSC/UAMS Southeastern Collaborative Research NETwork (CORNET) Awards, the first of several said to be awarded from Phase 3 of the CORNET Awards, were also announced during the event. Designed to promote new lines of team-based substance abuse research, two collaborative projects worth up to \$100,000 combined will be awarded to investigative teams with principal investigators from both UTHSC and UAMS on each proposal. Funding for the two UTHSC/UAMS



(UTHSC's Byron Jones, PhD, (left) was among the researchers attending the UTHSC/UAMS Research in Substance Abuse Mini-Symposium)

CORNET Awards will be provided for one year with each institution giving equal support.

At the event, attendees learned about each institution's substance abuse research programs from keynote speakers representing both universities. There was also a poster presentation during which researchers shared their work and ideas for future collaboration.

Both Drs. Goodman and Cornett expressed that they were very pleased with how the day unfolded. They were encouraged to see researchers from both campuses coming together to advance substance abuse research.

"What I liked about it is that although there are some overlapping strengths, we're also complementary to each other," said Goodman. "For example, UTHSC is particularly strong in mouse genomics while UAMS has highly regarded psychiatric research programs."

Dr. Cornett compared the mini-symposium to a school dance where players from both sides came together.

"Both of our institutions share commonalities in research, and we want to build upon those to strengthen our respective programs," said Cornett. "We also want to find meaningful collaborations that might address this growing problem with substance abuse and addiction in the US. I actually saw some dancing going on as the day progressed."

Both universities are already looking towards the Fall where UTHSC will host a mini-symposium on cancer research, another area of research overlap between the two campuses.

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UTHSC Researcher Heading Superfund Research Center

Hazardous substances at Superfund sites are frequently remediated using thermal processes. These processes produce particulate matter (PM), which can be found as a contaminant in soils or sediments and in air due to emissions from treatment facilities, or dust from additional remediation or containment activities. It is also widely assumed that the environmental and health effects of inhaled PM are due to the individual components of PM such as the particles, metals, or organic pollutants (i.e. chlorinated hydrocarbons (CHCs), polycyclic aromatic hydrocarbons (PAHs), etc.) or that the effects are simply additive. However, scientists at the Louisiana State University Superfund Research Center (LSU SRC) have shown that the pollutants and particles are complex mixtures that must be considered as a unified pollutant-particle system whose health and environmental impacts are due to surface-chemical reactions of its components.

The LSU SRC is comprised of researchers at LSU in Baton Rouge, the LSU Health Science Center in New Orleans, and the University of Tennessee Health Science Center in Memphis. The Center's focus is on these newly-identified pollutant-particle systems, including environmentally persistent free radicals (EPFRs), that form during many combustion processes. The LSU SRC researchers are studying how EPFRs are formed, how they affect human health, and how to prevent their formation and reduce human exposures.

Stephania Cormier, PhD, of the Department of Pediatrics at UTHSC, currently serves as the Center's director. She notes that because EPFRs are bound to the particles, they are difficult to detect and analyze and, as such, represent a previously unidentified and currently veiled environmental threat. As there are currently no rules or regulations for limiting or monitoring EPFRs in the environment, the studies from the LSU SRC will have important implications for guiding environmental and public health policy.

"We know that EPFRs are persistent in the environment for long periods of time (upwards of 12 hours). We



also know that if inhaled they can persist and generate more radicals in the body through a cyclic reaction, causing major damage to your DNA, heart, and lungs. Our research aims to determine how EPFRs are formed, decay, and stabilized on the surface of airborne PM, the chemical reactivity in physiological conditions, and interaction of EPFRs with polyaromatic hydrocarbons associated with PM using advanced surface and chemical analysis techniques.

Since the airway is a major entry site for these particles from the environment, we also explore mechanisms of EPFR-induced cardiovascular and pulmonary dysfunction with the expectation of translation of data to humans," says Cormier.

EPFRs are especially concerning when one considers their effects on newborns and kids. Recent studies have shown that infants and children may be especially sensitive to the toxic effects of EPFRs and other airborne PM. Dr. Cormier's lab discovered that early life exposure is linked to long-term, persistent lung disease.

"My team reported that gestational exposures to EPFRs increases the likelihood for developing asthma later in life," says Cormier. "In one study, we saw an increased allergic immune response after exposure to EPFRs ceased, but other types of immune responses were decreased. This EPFR-induced immunosuppression decreased the ability to fight infections – increasing influenza morbidity and mortality."

The LSU SRC believes an important part of this process is communicating with the public, health care professionals and environmental researchers, regulators and policy makers. Their ultimate goal is to protect human health and the environment by providing information to be used in risk-based decisions on treatment options for Superfund wastes.

The LSU Superfund Research Program is supported by the National Institute of Environmental Health Sciences Superfund Research Program grant number P42 ES013648.

Improving Institutional Research Core Function

Providing researchers with outstanding research infrastructure that will enhance discovery, productivity and the reputation of the University of Tennessee Health Science Center (UTHSC) research enterprise has been a primary focus during Dr. Goodman's first year of service as vice chancellor for Research (VCR). Institutional Core Facilities are a key component of the infrastructure, essential to maintaining international recognition of research programs, increasing extramural funding, supporting active research grants, and retention and recruitment of faculty. Institutional Research Cores are fee-for-service resources that are widely used among UTHSC faculty across multiple Colleges and Departments, and are financially supported by the Institution.

Over the past 8 months, the Office of Research spearheaded an in-depth review of campus Core Facilities. In November 2016, Dr. Tiffany Seagroves was appointed as the new associate vice chancellor for Research—Cores. In February 2016, the VCR's Research Cabinet advised Dr. Goodman that 7 cores fit the definition of an Institutional Core, and Dr. Goodman accepted the Cabinet's recommendations. As of FY17, the Institutional Cores include: the Lab Animal Care Unit (LACU); the Regional Biocontainment Lab (RBL); the Molecular Resource Center (MRC); the Flow Cytometry and Cell Sorting Core (FCCS); the Proteomics and Metabolomics Core (PMC); the Molecular Bioinformatics Core (mBIO); and the Research Histology Core (RHC). Internal Advisory Boards (IAB) for each core have been appointed by Dr. Goodman to advise on core operations, including core policies and procedures.

From March to April 2016, comprehensive business plans were developed in cooperation with each Core Director and the Core's IAB to identify current core strengths, weaknesses, opportunities and threats (SWOT) and to drive the creation of three-year projected operating budgets. Each year, this process will be repeated. The FY17-FY19 projected budgets were approved by the Research Council in May 2016.

In a model new to UTHSC, going forward fee structures for core services will be determined based upon a market evaluation of fees set by our peer academic institutions, with prices at UTHSC selected to rank in the bottom-half to bottom-third as compared to peer

academic core facilities. Prices for services will then be escalated by 3% each subsequent fiscal year. The Institutional Cores will be managed with a business-like model, using business plans to develop budgets and relying on data-based metrics to measure core successes. At the end of each fiscal period, an Institutional Research Core Facilities Analysis will be performed.

Several new and exciting investments for the cores are planned for FY17, including the purchase of an Illumina NextSeq500 next-generation sequencer in the MRC, replacement of the aging LSR II cytometer in the FCCS Core, hiring of additional staff in the mBIO Core, and substantial upgrading of LACU animal care facilities and resources.

In addition, the Office of Research is exploring new core management web-based tools to facilitate sample submission, sample workflows, invoicing, and generation of core usage metrics. A new seminar series will launch in Fall 2016 to advertise core competencies and to highlight recent discoveries by our faculty who use our cores- the "Core Success" seminars. "Core Days", open-house style events, will be hosted to encourage interactions with Core Directors and core staff. A new pilot project program, the "Core Bucks" program, will also be announced in Fall 2016. Finally, the Office of Research website is currently being redeveloped and will receive an updated, new look. Institutional Core descriptions and price lists will be easier to locate online and will be downloadable directly from the Institutional Cores webpage.

Overall, our new model of functional and financial core oversight will foster the research enterprise at UTHSC to achieve our common goal of doubling research within the next 10 years.

-Tiffany Seagroves, Ph.D.
Vice Chancellor for Research- Cores



Addiction: A Comprehensive Approach To Treatment



Alex Dopico, MD, PhD, and chair of the Pharmacology Department at UTHSC has spent more than 20 years researching the effects of addictive drugs, alcohol in particular, on the brain. The American Society of Addiction Medicine (ASAM) defines addiction as “a primary, chronic disease of the brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.”

Dr. Dopico points out that for years addiction was seen as a moral issue where the addict’s choices were linked to a tainted moral or willpower. Today, current research indicates that addiction is associated with an actual “rewiring” of the brain. This happens as the brain goes through a series of alterations, beginning with recognition of reward and evolving into compulsive behavior.

The “reward system” of the brain registers all pleasures using a distinct signature: the release of dopamine in the ventral tegmental area and Nucleus Accumbens. Addiction affects the activity of these dopaminergic neurons and their interaction with other brain areas, including the hippocampus, which lays down memories of the hedonic experience, and the amygdala, which is involved in stress and drug craving. Moreover, current theories suggest that dopamine itself plays a role in learning and memory, necessary processes in going from liking something to becoming addicted to it.

“When we compare an addict’s brain to a healthy brain, there is a definitive difference in structure and function. In an addict, a given hedonic point is only reached in the presence of the addictive stimulus and, more often than

not, it requires an increased exposure in amount and/or frequency to reach such point,” says Dopico. “As the condition progresses, fear and anticipation take over, and the addict requires the addictive stimulus to avoid the negative consequences of its absence. This stage is usually associated with a compulsive stimulus (e.g., drug-seeking).”

According to ASAM, genetics accounts for about half of the likelihood that an individual will develop an addiction. Other risk factors include environment, culture, trauma (particularly in childhood/early adolescence), early exposure to the substance, disruption of social support, problems in interpersonal relationships, etc. Like many chronic diseases, addiction often involves cycles of relapse and remission, where all the aspects mentioned above play a role. Therefore, Dr. Dopico suggests that addiction cannot be effectively treated or prevented without a comprehensive approach.

“A comprehensive approach is key to treating and preventing addictive behaviors. Since we know addiction is as much of a genetic issue as it is an environmental one, we have to look at treatment that way,” says Dopico.

Reflecting on President Obama’s new Precision Medicine Initiative, Dopico notes that we are entering into a new era of individualized care in which researchers, providers, and patients work together to develop individualized treatment plans. This approach to addiction could not align more perfectly with the idea of cross-colaborative team science that UTHSC fosters.

“At UTHSC, we have the opportunity of advancing across all aspects of addiction, as we boast powerful academic units that are excellent for fellowships and residency, and have a focus on collaborative research.”

Dr. Dopico is currently working on the development of a drug that targets membrane proteins that control physiological and behavioral changes associated with acute alcohol intoxication, in order to prevent or reverse those effects. His Method to Extend Research in Time (MERIT) Award grant, which is being funded by the National Institute on Alcohol Abuse and Alcoholism, is for \$3.6 million over a 10-year span.

“The point of finding ‘alcohol antagonists’ would be to counteract the detrimental action of alcohol on brain circulation and blood flow during acute alcohol intoxication. However, treatment of chronic alcoholism would require much more than a ‘magic pill.’ A comprehensive approach is a must.”

New Faculty Spotlight: Dr. Ansley Stanfill

Ansley Grimes Stanfill, PhD, RN, joined the faculty in March 2016 with a joint appointment as an assistant professor in the Department of Advanced Practice and Doctoral Studies through the College of Nursing, and in the Genetics, Genomics and Informatics Department through the College of Medicine. She received her BS in neuroscience from Vanderbilt University in 2003 and her BSN from Saint Louis University in 2007 while working as a research assistant in genetics and neuroimaging research. Dr. Stanfill also has clinical experience in neurology and neurosurgery, endoscopy, and critical care.

In 2011, Dr. Stanfill was selected to participate in the highly competitive National Institute of Nursing Research's (NINR) Summer Genetics Institute. This is a month long intensive research training course held at the National Institutes of Health (NIH) in Bethesda, Maryland. Riding on the coattails of the precision medicine movement, the program brings together nurses and researchers with interdisciplinary backgrounds looking for training in genomics techniques. Dr. Stanfill has been an invited alumna speaker for the boot camp since 2015 and teaches a course on the integration of omics in nursing research during the program.

She was awarded her PhD in 2014 from UTHSC for her dissertation titled "Dopaminergic genetic contributions to obesity in kidney transplant recipients" for which she received a NIH/NINR F31 predoctoral fellowship grant. Immediately following her graduation, she completed her postdoctoral training in omics research at the University of Pittsburgh, supported by the NIH/NINR T32 "Targeted Research and Academic Training of Nurses in Genomics."

Dr. Stanfill's research is focused on the influence of genetic and epigenetic factors on long-term outcomes in neurological injury and chronic diseases. Her primary project is titled "Clinical, demographic, genetic, and epigenetic determinants of health related quality of life post aneurysmal subarachnoid hemorrhage." Along with her

co-investigators, she was awarded a UTHSC Collaborative Research NETWORK (CORNET) award for this work. She is currently enrolling patients that have sustained an aneurysmal subarachnoid hemorrhage (a specific type of stroke) at Methodist University Hospital or at Baptist Memorial Hospital. Dr. Stanfill

is then collecting blood and cerebrospinal fluid (obtained non-invasively from a ventriculostomy) for 14 days after admission, and analyzing genetic and epigenetic data as well as clinical and demographic data, for associations with physical, cognitive, and mental health outcomes at 6 months post-stroke. She is also working on another project titled "A Mixed-Methods Analysis of the Effects and Recovery Trajectory for Concussion/mTBI," for which she was recently awarded a Dean's Research Fellowship from the College of Nursing. This work prospectively follows student athletes over the course of the academic year and seeks to identify biomarkers that could be used to better determine safe return to play after a sports-related concussion.

Although early in her research career, Dr. Stanfill has been principle investigator on seven research grants, resulting in work that has been published in nursing, medical, and basic science journals. Furthermore, she has presented her work at conferences locally, regionally, nationally, and around the world. Dr. Stanfill is a member of several professional groups including Sigma Theta Tau, the International Society of Nurses in Genetics, and the American Society of Human Genetics.



Have a story we should include?
Submissions and ideas can be sent to:
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Nursing plays many roles in healthcare and the advancement of science. When most individuals think of a nurse, they picture a bedside nurse in a hospital caring for a patient. This is an important role and a nursing shortage is reaching a critical point for the health of our communities. However, nurses engage in many roles, including policy

development, management, education, and research. In research, nurses at the baccalaureate and masters level may serve as a research nurse, however nurses at the PhD level serve as nurse scientists. Sometimes our peers do not differentiate between these two roles. However, these roles are vastly different, although both are critical in our healthcare environment.

A research nurse's role is complex and varied. Although not the principal investigator, ultimately responsible for the study, research nurses coordinate the day-to-day management of the study. These nurses should possess leadership skills and be adaptable and flexible to manage the various nuances of a study. Research nurses prepare trial protocols and other trial-related documents, submit study proposals to regulatory bodies, and coordinate the initiation, management, and completion of the research. Patient advocacy is the most important responsibility of the research nurse, emphasizing the protection, safety, and wellbeing of the study participants. Research nurses are vital for all clinical studies and can enable the institution to radically increase its research productivity.

In comparison, nurse scientists are doctoral –prepared, principal investigators, designing and implementing scientific studies on ways to improve health, health care services, and health care outcomes. Nurse Scientists use multiple philosophical and theory-based approaches as well as diverse methodologies. Nursing research focuses on the understanding and easement of the symptoms of acute and chronic illness; prevention or delayed onset of

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disease or disability, or slowing the progression thereof; finding effective approaches to achieve and sustain optimal health; and improvement of the clinical settings in which care is provided (National Institute of Nursing Research, 2003).

Few other scientists are interested in nursing practice and nursing practice is the majority of what occurs not only in the hospital but also in the community. Nursing science and the nurse scientist provides an important and unique contribution to health care and health policy. With the Affordable Care Act as a catalyst for developing new health care delivery and payment systems that improve outcomes and decrease costs, nursing science can play a key role in developing and evaluating interventions and healthcare models. Nurse Scientists are fundamentally well prepared for multidisciplinary scientific work. In a practice discipline such as nursing there is the added dimension of thoughtful and discriminating application of knowledge from other disciplines and perspectives (Carper, 1978).

As UTHSC continues to move towards the national call for multidisciplinary research teams, nurses scientist stand prepared and ready for the opportunity. Specifically, the UTHSC College of Nursing has been provided tremendous support and resources from the Chancellery to grow research. Over the past two years, the College of Nursing has hired four new nurse scientists dedicated to building their programs of research. We anticipate hiring an additional four to five more dedicated nurse scientists over the next two years, including an Associate Dean of Research. As we continue to grow our research portfolio in the College of Nursing, it is important to seek ways to streamline processes for nurse scientists to implement and conduct their studies and for nurse scientists to be recognized as principal investigators leading research studies.

**-Wendy Likes, Ph.D., DNSc, APRN-Bc, FAANP
Dean, College of Nursing**

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VA, UTHSC Professor Receives Top National Ranking for Chronic Kidney Disease Research

Expertscape.com, a medical search and content service that enables healthcare consumers to easily identify and research medical experts by condition, expertise, and location, recently named the Department of Veterans Affairs (VA) health care system number 1 worldwide in Chronic Kidney Disease (CKD) research. Csaba P. Kovesdy, MD, FASN, director of the Clinical Outcomes and Clinical Trials Program in Nephrology at UTHSC and chief of Nephrology Section at the Memphis VA Medical Center (VAMC) was also listed as number 3 of 74,300 published authors worldwide on chronic kidney disease. Expertscape categorizes individuals and institutions objectively based on their expertise in over 26,000 different biomedical topics. The experts chosen by Expertscape have proven proficiency in their respective fields by putting their knowledge on paper and getting it through the rigorous review process that characterizes scientific publication.

According to the National Kidney Foundation, 26 million American adults have CKD and millions of others are at increased risk. Experts say that due to the high numbers of people in the Southern US living with diabetes and high blood pressure, the leading causes of chronic kidney disease, that these people are at an increased risk of developing CKD. African Americans are also at increased risk. In Shelby County alone, over 1,200 residents rely on lifesaving dialysis, often three times per week. The VA provides healthcare services to Veterans with CKD, whether or not they have a service-connected or non-service connected status.

Since 2006, Dr. Kovesdy has published over 113 articles on chronic kidney failure. His major interest in CKD is focused on cardiovascular outcomes and racial disparities in patients with pre-dialysis stages of CKD. Dr. Kovesdy joined the UTHSC faculty in July of 2012 as the Fred Hatch Professor of Medicine in Nephrology. He also works as a clinical researcher mainly conducting clinical and observational trials, administered at UTHSC and the Memphis VAMC. Dr. Kovesdy is one of nine doctors at

UTHSC (and five at the Memphis VA) who specialize in Nephrology. He is the recipient of an NIH United States Renal Data System (USRDS) Special Study Center (U01) Grant where he is researching the transition of patients from the pre-dialysis period to the dialysis period.

Dr. Kovesdy notes that both UTHSC and the Memphis VA Medical Center are well-positioned for continued success in the Mid-South for treating patients with CKD and many other illnesses. The Clinical Outcomes and Clinical Trials Program in Nephrology at UTHSC has several national and international partnerships including affiliations with the University of California- Irvine, Johns Hopkins University, Vanderbilt University, the University of Michigan and researchers in Sweden. The newly established DaVita hemodialysis biorepository at UTHSC (which contains over 100,000 biological samples collected from over 1,000 hemodialysis patients) gives researchers access to a wealth of genetic and proteomic information, and is a resource only available to three other major centers in the US. Through a partnership with the Nashville VAMC and Vanderbilt, Nephrologists at the Memphis VAMC are also participating in the ongoing Million Veteran Program, which is one of largest genetic studies in the world. Moreover, he adds that the relationship between researchers at UTHSC and the Memphis VAMC provides a unique opportunity for collaboration and discovery that can benefit both the health of our veterans as well as the general population in Shelby County and surrounding areas.



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“Raining All Over the World” A Message from Dr. Steven R. Goodman

In late May 2016, I spent 10 days in China on behalf of UTHSC. The first four days were spent in Northern China at Harbin Medical University where I was joined by Dr. Steph Cormier, Dr. Steve Youngentob, and Dr. Weikuan Gu. We met with President Baofeng Yang, Vice President Dianjun Sun and other Harbin Medical University officials (upper left panel) for the purpose of advancing the current MOU between our Academic Health Centers to a granular discussion of what scientific areas these collaborations will focus on and how will they work. We will continue this discussion when Vice President Sun visits UTHSC in the coming months.

I then proceeded on to Chengdu, with Dr. Youngentob, where we visited Sichuan University and West China Hospital. Our visit to Chengdu was hosted by Dr. James Kang (lower left panel, second to the left) who is a China National One-Thousand-Talents Theme Professor and director of the Regenerative Medicine Research Center. We attended the Stem Cell and Health Industry Forum and the Inauguration of the Sichuan 3D Bioprinting Institute that Dr. Kang directs. During our discussions with Dr. Kang, we have developed the concept of a research-related exchange of students, post-doctoral fellows, and faculty between our two institutions. We will continue these discussions when James visits UTHSC on September 21st and 22nd during which he will also be delivering a VCR Distinguished Lecture.

We met the Nobel Laureate Sir John Gurdon (lower left panel, standing on my right) while in Chengdu as well. Sir John then traveled with us to Kunming where we all gave keynote lectures at the World Health Conference. Upon our return to Chengdu, we continued our discussion of the future collaborations between Sichuan University/West China Hospital and UTHSC. In Chengdu, I got to watch the “Changing Masks” artist in the right panel, who has become my personal body-guard (just joking!).

Creating global partnerships in research is important for a myriad of reasons including broadening our network of potential valuable collaborators, opening up new grant award



opportunities that are only available through international collaborations, and giving our UTHSC investigators the opportunity to experience new approaches to science. I feel that this is so important that I have appointed Dr. Steph Cormier as our inaugural UTHSC **associate vice chancellor for Research and Global Partnerships** and Dr. Weikuan Gu as the **assistant vice chancellor for Research and Global Partnerships**. Together Steph and Weikuan “will aid in the development of global connections, collaborations, and enhance the UT research environment. Towards this goal, the AVCR will establish cooperative agreements with global academic medical institutions in the Areas of Excellence, and the Focus Areas” as described in our UTHSC “Operational Strategic Plan.”

With the help of Steph, Weikuan, and the UTHSC research faculty we will enhance our research partnerships and ensure that it is “Raining all over the world” (a song by this title that you might enjoy by The Adventures has nothing to do with this article).

-Steven R. Goodman, Ph.D.
Vice Chancellor for Research

