THE UNIVERSITY OF TEXAS AT EL PASO

RESEARCH GUIDE

Spring 2010

INSIDE

UTEP Fast Facts

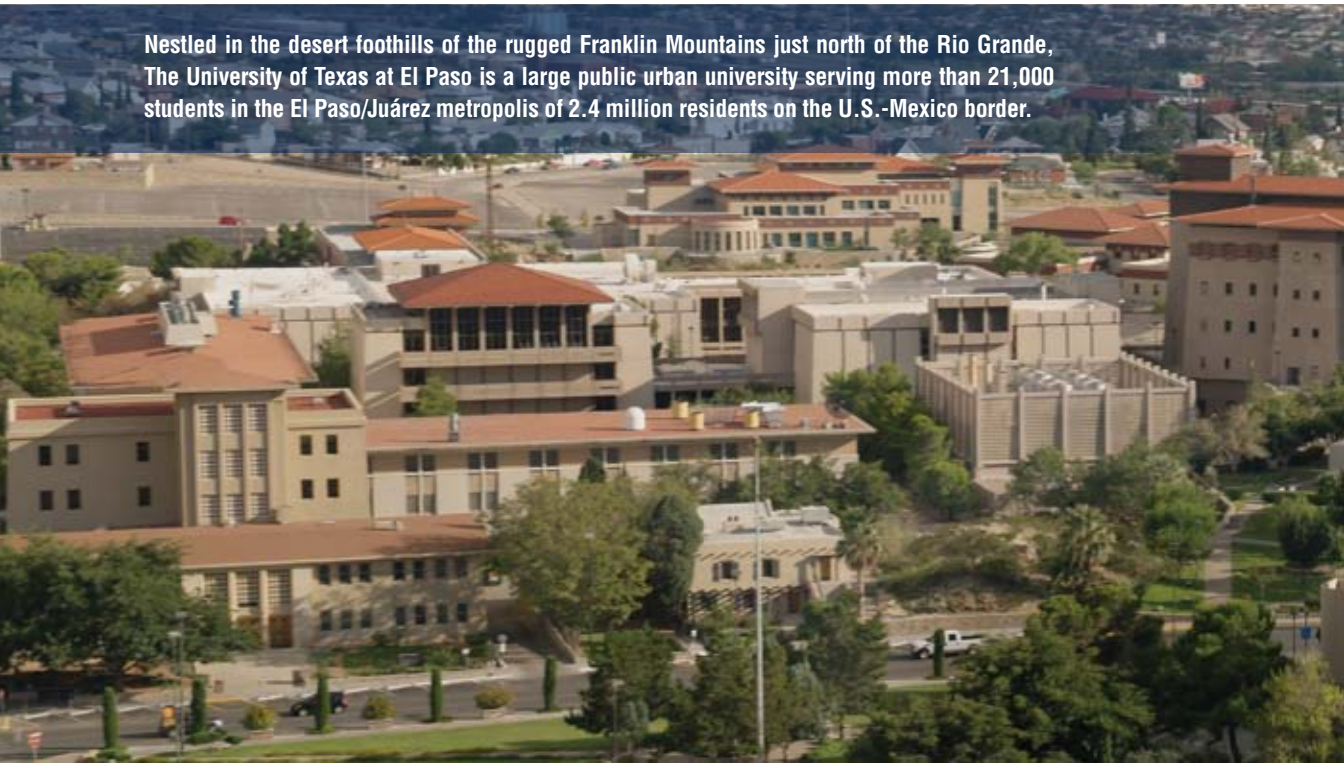
- The Texas Higher Education Coordinating Board has designated The University of Texas at El Paso (UTEP) as one of the state's seven emerging Tier One universities. Supported by the funding avenues set out by House Bill 51 in June 2009 and Proposition 4, passed in November 2009, UTEP has embarked on a communitywide campaign to reach Tier One status.

- In fall 2009, UTEP enrolled a record 21,011 students—the eighth consecutive record fall enrollment. The spring 2010 enrollment of 20,198 students also surpassed previous spring semester records.

- UTEP proudly delivers higher education access and excellence to a 21st century demographic—75 percent of the University's students are Hispanic, and more than half are the first in their families to attend college.

- With $60 million in total annual research spending, UTEP ranks second among The University of Texas System academic institutions in federally funded research expenditures after UT Austin, and fourth in the state after UT Austin, Texas A&M University and the University of Houston. UTEP makes the most of its strengths in the areas of biomedicine, Hispanic health disparities, border and homeland security, environmental and Earth science, emerging technologies, and borderland arts and humanities. The Carnegie Foundation classifies UTEP as a "high research activity," doctorate-granting university.

- UTEP scientists have received numerous awards of $1 million and more from prestigious research programs sponsored by the National Science Foundation, the National Institutes of Health, the Department of Defense, the National Aeronautics and Space Administration and other public and private agencies.



Nestled in the desert foothills of the rugged Franklin Mountains just north of the Rio Grande, The University of Texas at El Paso is a large public urban university serving more than 21,000 students in the El Paso/Juárez metropolis of 2.4 million residents on the U.S.-Mexico border.

- UTEP offers 79 bachelor's degrees, 86 master's degrees and 16 doctorates—with more in development. UTEP also offers cooperative Ph.D. programs in pharmacy and nursing with UT Austin and the UT Health Sciences Center at Houston.

- UTEP is a key economic force in the Paso del Norte region that includes West Texas, Southern New Mexico and Northern Mexico. UTEP's operating budget for FY09-10 is $355 million. According to the UTEP Institute for Policy and Economic Development, the University's contribution to the personal income of local individuals in the region is $343 million, and the number of jobs attributed to UTEP's presence totals 6,123.

- On the playing field, the UTEP Miners compete in Division 1 sports as a member of Conference USA's West Division. UTEP is home to the 51,500-seat Sun Bowl Stadium and the 12,222-seat Don Haskins Center, named for the legendary coach who, in 1966, delivered Texas' only Division I Men's Basketball Championship.

- In the 2008-09 academic year, the University embarked on an unprecedented $250 million program of new construction and renovation projects, including a teaching and research building for chemistry and computer science; a facility for the College of Health Sciences and the School of Nursing; a new University Bookstore and the Foster•Stevens Basketball Complex.

- UTEP has nearly 1,200 faculty, and one of the highest percentages of minority faculty among universities in the United States—more than 30 percent.

Overview


THE UNIVERSITY OF TEXAS AT EL PASO
Main Campus
Sun Bowl
Don Haskins Center
Physical Plant
UNIVERSITY BOOKSTOR

THE UNIVERSITY OF TEXAS AT EL PASO

The University of Texas at El Paso is located in El Paso, Texas, on the northern bank of the Rio Grande along the U.S.-Mexico border. UTEP students live and study in one of the world's largest binational metropolitan areas, pursuing cultural, social and academic opportunities not available on most university campuses.

UTEP has been a cornerstone of the El Paso community since it was founded as the Texas School of Mines and Metallurgy almost 100 years ago.

In 1914, the school opened with 27 students and a handful of faculty and staff. From this modest beginning, UTEP has grown into a dynamic urban university that serves the needs of more than 21,000 students.

Nearly 76 percent of UTEP's student population is Mexican-American. In recognition of the University's success in creating educational opportunities for nontraditional students, the National Science Foundation designated UTEP as a Model Institution for Excellence, one of only six in the country. This has resulted in a multimillion-dollar NSF grant to support UTEP's science, computer science, engineering and mathematics programs.

Capitalizing on the University's border setting, faculty research focuses on areas such as biomedicine, environmental science and engineering, and manufacturing engineering. Research expenditures totaled more than $50 million in 2008, the last year for which comparative figures are available. The University's undergraduate students participate in hands-on research, working at a professional level unheard of at other universities. Students also have many opportunities to participate in binational research programs between UTEP and higher education institutions in Mexico.

To expand its research capabilities, UTEP has embarked on an unprecedented $250 million program of new construction and renovation projects, the most significant single campus transformation in its history. New construction includes a teaching/research building for chemistry and computer science and expansion of the science and engineering complex as well as a new $60 million facility for the College of Health Sciences and School of Nursing.

UTEP's achievements extend far beyond its traditional strengths in science and engineering. The University has received national acclaim for innovative programs in business, fine arts, education, humanities and health sciences.

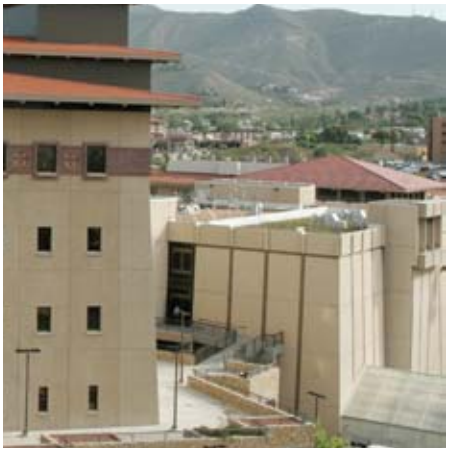
The Carnegie Foundation ranks UTEP as a doctorate-granting university with high research activity, placing the University among the top 7 percent of all colleges and universities in the United States. This classification reflects UTEP's success in providing its students with opportunities to pursue advanced degrees in a broad range of fields. Today, the University offers 16 doctoral degree programs, and two more—in nursing and pharmacy—through cooperative programs with UT Austin and the UT Health Science Center at Houston.

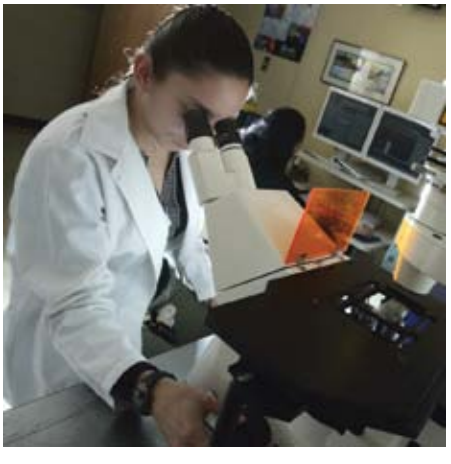
Proposals for new doctoral programs, including a Ph.D. in Ecology and Evolutionary Biology and Doctors of Nursing Practice, Physical Therapy, and Public Administration degrees, have been sent to the UT System and the Higher Education Coordinating Board for review.

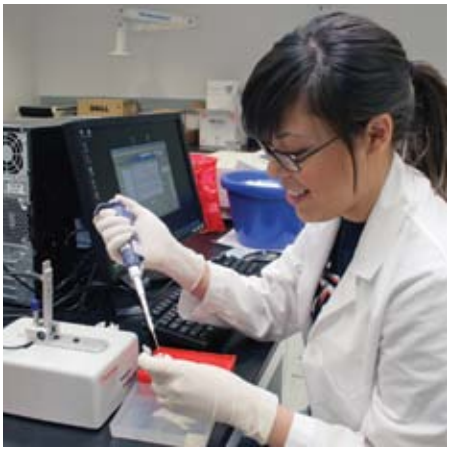
About This Guide







WWW.UTEP.EDU
THE UNIVERSITY OF TEXAS AT EL PASO

A NEW ERA OF RESEARCH

An exciting era of discovery and innovation is under way at The University of Texas at El Paso.

At UTEP's state-of-the-art Bioscience Research Building, researchers are advancing the field of "personalized medicine" by studying genetic targets for treatment of cancer and infectious diseases. Inside the walls of the College of Engineering, the field of bioengineering is flourishing as engineers, biologists and physicians collaborate on projects involving engineered tissue, novel medical devices and cutting-edge imaging technologies.

And the future looks bright as UTEP positions itself to grow its research capacity: a $70.2 million, 140,000-square-foot Chemistry and Computer Science Building and a $60 million, 130,000-square-foot College of Health Sciences/ School of Nursing are under construction and expected to open in 2011.

The investment in outstanding faculty, equipment and facilities supports UTEP's goal of becoming one of Texas' next national research universities.

This edition of the *UTEP Research Guide* highlights many of the projects and programs that are taking UTEP to a higher level of research excellence.

ON THE ROAD TO TIER ONE

UTEP's unique characteristics make it an ideal candidate to become one of the country's next national research (Tier One) universities. Part of UTEP's ability to provide a quality education for its students has to do with the University's geographic location. Situated on the U.S.-Mexico border, El Paso is the largest border community in the world, and through its bilingual and bicultural population, the area provides the UTEP faculty and students with rich opportunities to conduct research that few, if any, institutions can match. These include border health, border security, geological studies and education reform. The El Paso region represents a laboratory for research on these topics, providing investigators with an environment unlike any other in the world.

UTEP Takes Steps Toward Tier One

The year 2009 may well be remembered as representing a critical turning point in transforming higher education in Texas, and at The University of Texas at El Paso in particular. The most exciting specific development was the passage of legislation designed to elevate UTEP and six other institutions to national research (Tier One) university status. UTEP's significant progress in research and doctoral education during the past 20 years had already earned us designation by the Texas Higher Education Coordinating Board as an "Emerging Tier One university." The 81st Legislature moved UTEP a step closer to this Tier One goal by creating a framework of state-funded incentives to reward UTEP and the other six institutions for the progress we make in continuing to move toward it.

Specifically, House Bill 51 awards state matching funds to UTEP and other emerging Tier One universities for success in securing competitive research grants and philanthropic gifts that support research and doctoral program growth and productivity on our campuses. As part of the new Texas Research Incentive Program (TRIP), gifts to UTEP of $100,000 or more from generous donors, who designate them for support of research and doctoral education, may be matched from a pool of state funds appropriated for this purpose. With such support, UTEP will be able to recruit and retain additional highly competitive faculty and doctoral students who will create a climate of research and scholarship that will accelerate our momentum toward becoming a Tier One university, the first in the U.S. with a 21st century demographic.

There were other important actions taken by the 81st Texas Legislature, such as the creation of the Research University Development Fund. This fund will distribute dollars to emerging research universities to support activities that promote increased research capacity. Disbursements will be based on a formula related to each university's annual research expenditures.

Through these legislative actions, the commitment to transform Texas higher education has truly begun.

Texas voters joined in showing their support for this transformation of higher education. On Nov. 3, 2009, state voters—including 78 percent of El Pasoans who participated in the election—approved Proposition 4 to establish the National Research University Fund. The fund will provide incentives to universities that meet critical benchmarks toward achieving national prominence as major research universities.

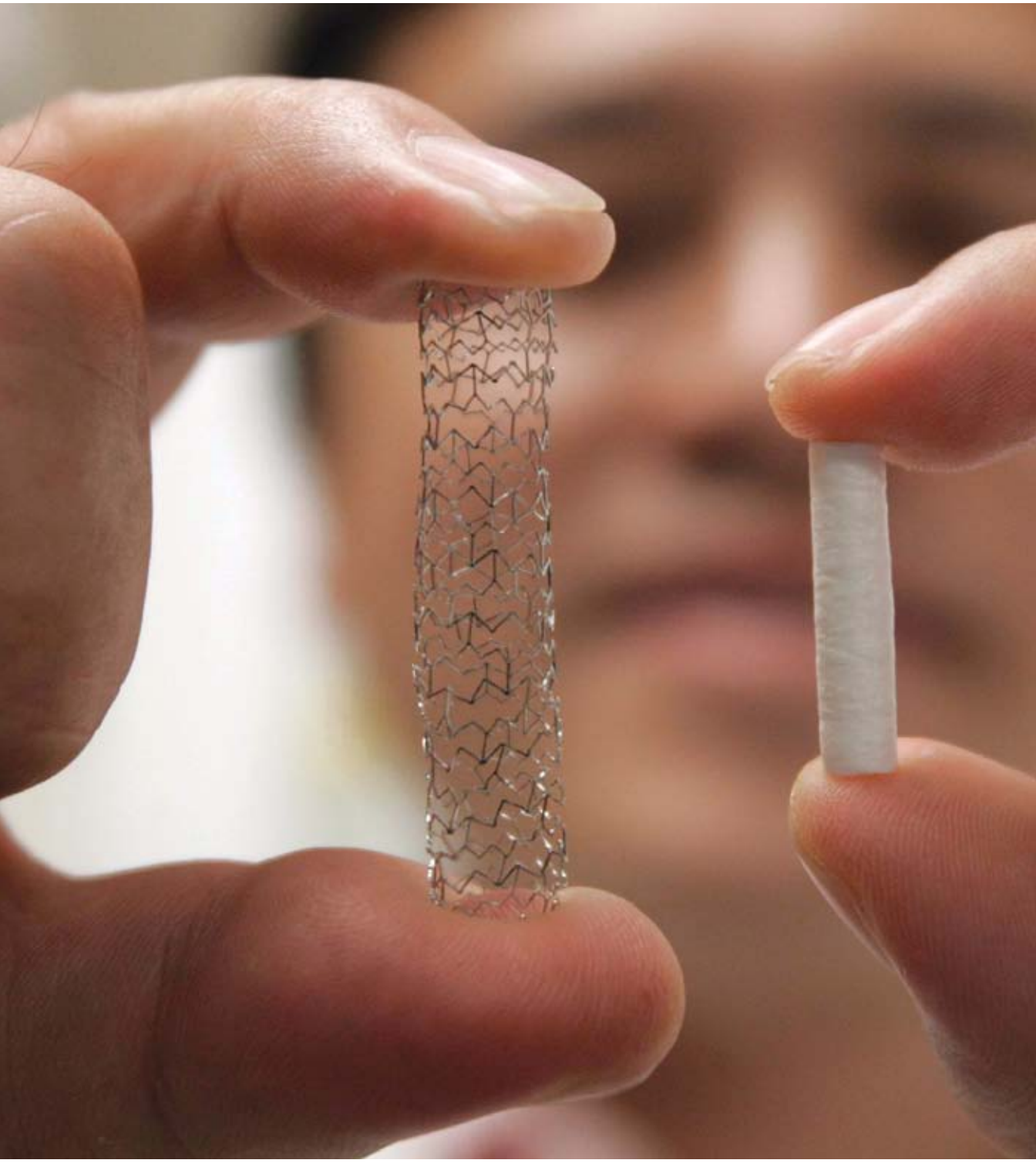
This bold commitment to higher education by Texas voters and the state legislature comes at a time when many other state governments, from Arizona to California to Florida, have responded to the severe economic downturns they face by dramatically reducing investments in their public universities. By contrast, Texas is building on its ambitious "Closing the Gaps" student participation and success goals by turning its attention to increasing the number of universities across the state whose heightened level of research and graduate education will assure Texas' competitiveness and quality of life in the global economy of the 21st century. And with continued hard work and support of our alumni and friends, UTEP will surely be one of those universities!

Diana Natalicio

Diana Natalicio
UTEP President

"We can all be very proud of the progress we've made, and confident that it is providing us the momentum required to achieve UTEP's goal of becoming a Tier One University."
—Diana Natalicio, Ph.D.
President,
The University of Texas at El Paso

Biomedical Engineering



PHYSICIANS AND ENGINEERS ENGAGE IN RESEARCH COLLABORATIONS

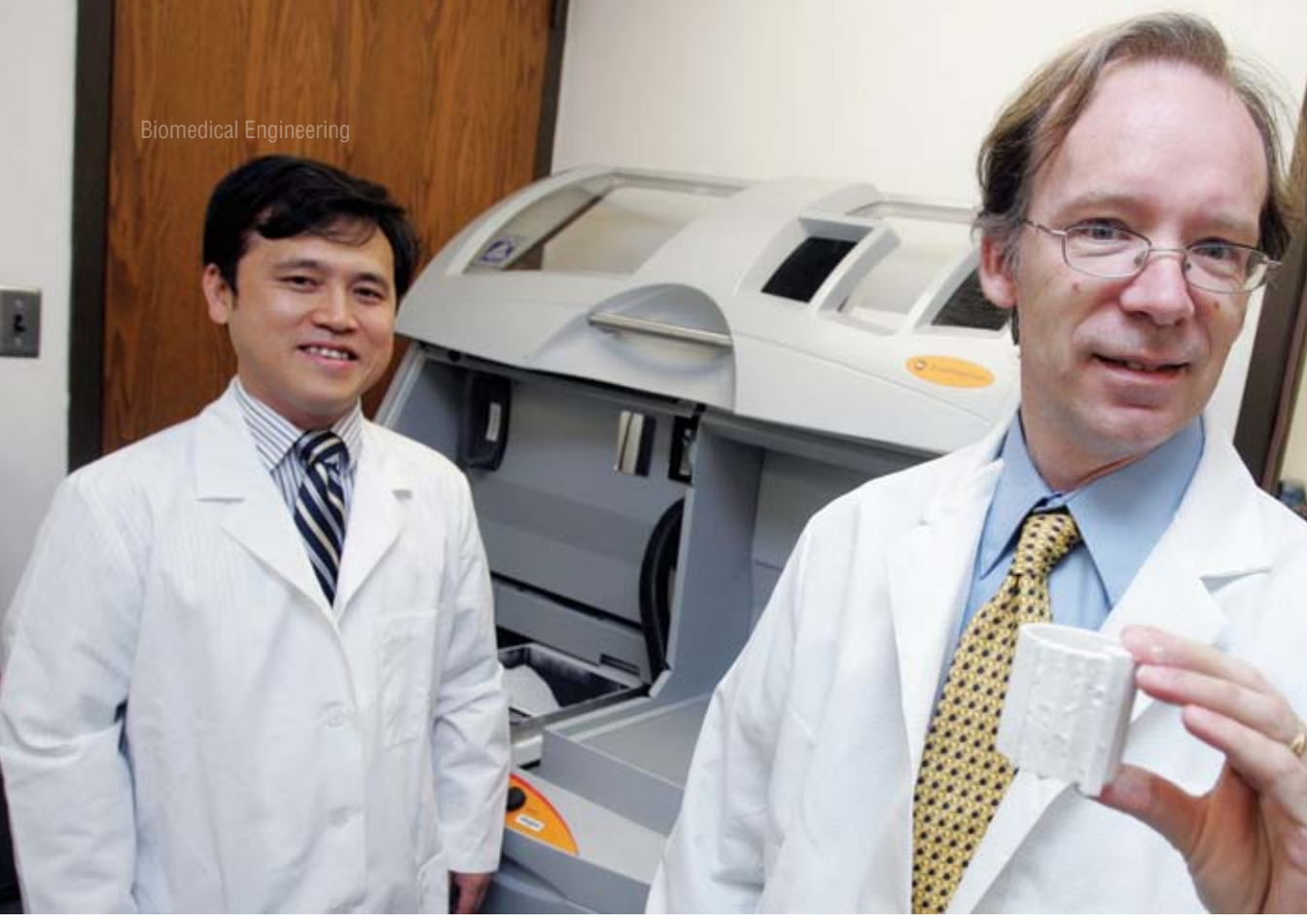
With the recent opening of the first four-year medical school on the U.S.-Mexico border, biomedical engineering research at UTEP is growing stronger than ever.

UTEP faculty are collaborating with teaching physicians at the Paul L. Foster School of Medicine at Texas Tech University Health Sciences Center in El Paso on a variety of bioengineering projects.

For example, Tao Xu, Ph.D., assistant professor of mechanical engineering at UTEP, is working with Daniel Terreros, M.D., professor of pathology at the Paul L. Foster School of Medicine, on a project that aims to reduce the cost and improve the performance of nerve guide conduits. Constructed of nano-sized fibers, the conduits hold promise for the repair of injured nerves.

Other projects led by UTEP engineers are breaking the boundaries between medicine and machines. At UTEP's W.M. Keck Center for 3-D Innovation, researchers are using rapid-prototyping technology to build tissue-engineering scaffolds and models of organs and bones for surgical planning. And in the Laboratory for Human Motion Analysis and Neurorehabilitation, engineering experts are improving diagnosis and treatment for people suffering from nerve disorders and injuries.

UTEP's momentum in bioengineering research is creating great opportunities for students interested in this cutting-edge field of study: new master's and Ph.D. programs in biomedical engineering are in the works.



Tao Xu, Ph.D. *Thomas Boland, Ph.D*

Bioprinting Expertise

New arrivals provide leadership for cutting-edge research programs

By attracting talented researchers in the field of tissue engineering, the UTEP College of Engineering is making impressive strides in building its new biomedical engineering programs.

Thomas Boland, Ph.D., an expert on bioprinting—the use of inkjet printers to make three-dimensional living tissue—joined UTEP as a professor of metallurgical and materials engineering in the fall of 2009. Boland came by way of Clemson University, where he was instrumental in developing Clemson's bioengineering program. Boland will serve as the future director of UTEP's biomedical engineering programs. A master's of science and Ph.D. in bioengineering are expected to be offered in the near future.

"Dr. Boland brings the necessary experience and research credibility to get those programs off to a great start," said College of Engineering Dean Richard Schoephoerster, Ph.D.

Another recent arrival is Assistant Professor of Mechanical Engineering Tao Xu, who earned his Ph.D. in bioengineering from Clemson University. Xu also is an expert in bioprinting and medical-device fabrication, and has begun collaborative research projects with physicians at the Paul L. Foster School of Medicine at Texas Tech University Health Sciences Center at El Paso.

Xu and Assistant Professor of Mechanical Engineering Connie Gomez, Ph.D., an expert on the design and fabrication of scaffolds for tissue engineering, will lead the new interdisciplinary Biomodeling and Biodesign Laboratory in the College of Engineering.

Connie Gomez, Ph.D.

Research Assets

W.M. Keck Center for 3-D Innovation
research.utep.edu/wmkeck
- *Tissue engineering*
- *Cardiovascular hemodynamics*
- *Imaging, modeling and manufacturing*

Laboratory for Human Motion Analysis and Rehabilitation
humanlocomotion.utep.edu
- *Biorobotics*
- *Biomedical instrumentation and design*
- *Design, manufacturing and testing of assistive devices*
- *Fabrication of biosensors*

Laboratory for Industrial Metrology and Automation
- *Human motion analysis*
- *Biosensors*
- *Cybernetics and systems science*

Medical Imaging Informatics Laboratory
engineering.utep.edu/imaginginformatics
- *Medical imaging informatics*
- *Telemedicine*
- *Computerized biomedical imaging*
- *Molecular imaging biomarker analysis*

Medical Imaging Informatics

Researchers develop improved diagnostic tools

UTEP's Medical Imaging Informatics laboratory, directed by Professor of Electrical and Computer Engineering Wei Qian, Ph.D., focuses on the collection and interpretation of data from medical imaging systems, such as X-ray, magnetic resonance imaging (MRI), nuclear resonance imaging and ultrasound.

In addition to designing improved computer-aided medical imaging diagnosis systems, Qian's research team is focusing on telemedicine, including remote image-guided diagnosis and treatment planning of cancers and other diseases.

Another major research area involves breast cancer, which is the No. 1 cause of cancer death in Hispanic women. Qian aims to improve survival rates and quality of life of cancer patients through the use of computerized cancer biomarker analysis. This advanced technology integrates medical, cellular and molecular imaging data into a computerized system to assist physicians in detecting, diagnosing and treating cancers.

"Our imaging research will fill a niche in border and Hispanic health by developing improved ways for physicians to diagnose and treat cancers."

—Wei Qian, Ph.D.

Biomedical Sciences

TARGETING BORDER HEALTH ISSUES

Biomedical research at UTEP is taking aim at cancer, HIV/AIDS, diabetes and other health conditions impacting our community on the U.S.-Mexico border.

The nexus of many of these investigations can be found at the Border Biomedical Research Center (BBRC), housed in UTEP's new $45 million state-of-the-art Bioscience Research Building.

Established in 1992 with support from the National Institutes of Health Research Centers in Minority Institutions (RCMI) program, the BBRC focuses on infectious diseases, neuroscience and metabolic disorders, and toxicology.

The RCMI program recently awarded the center an additional five-year grant totaling $12.4 million, which will be used to recruit additional faculty and post-doctorate researchers.

The BBRC's core research facilities include laboratories for analytical cytology, cell culture and statistics, plus facilities for biomolecule characterization and DNA analysis.

Targeted Therapy

New drug holds potential for treatment of T and B cell leukemias and lymphomas

A UTEP biochemistry research team led by Professor and Chair of Biological Sciences Robert Kirken, Ph.D., is testing a promising new drug for treating leukemias and lymphomas of T and B cells, white blood cells that play an important role in the immune system.

Kirken's team has found that an enzyme primarily expressed in these immune cells, known as Jak3, plays a critical role in the uncontrolled division of cells characteristic of these types of cancers. Their drug targets Jak3, inhibiting its activity and disrupting its ability to send cell growth signals down the biochemical pathway, but not affecting other enzymes or cell types.

"In laboratory testing, we have had encouraging results—the compound was successful in reducing the growth of certain human leukemia and lymphoma cell lines," Kirken said. In animal studies, the drug is well tolerated and does not appear to elicit the side effects that limit the effectiveness of other compounds.

Current treatment options for leukemia and lymphoma include chemotherapy and radiation therapy to kill cancer cells. But healthy cells are affected as well, leading to an array of adverse side effects, such as anemia, fatigue, nausea, diarrhea and hair loss.

Kirken's approach of using an enzyme inhibitor to selectively target this enzyme, which is not found in tissues such as the stomach, heart, liver, kidney or brain, would mean that cancer patients may be able to avoid the negative side effects associated with drug toxicity.

"Jak3 holds promise as a unique molecular and therapeutic target for abating a number of immune-derived diseases."

—Robert Kirken, Ph.D.

Fatty Acids and Colon Cancer

Researchers look for effective drug targets

A research team led by Professor of Biological Sciences Siddhartha Das, Ph.D., is investigating the biochemical responses triggered by certain dietary fats, and their role in causing colorectal cancer.

American diets, which are typically high in processed foods made with vegetable oils and low in fresh fish, often have an imbalance of omega-6 fatty acids, which promote an inflammatory immune system response that leads to a variety of health problems, including colorectal cancer.

Das' group is exploring the link between dietary fat and colorectal cancer by studying the behavior of a particular omega-6 fatty acid, known as arachidonic acid.

"The synthesis and metabolism of arachidonic acid seems to play a major role in producing inflammatory molecules responsible for uncontrolled cell growth that leads to tumors of the colon," Das said.

Das is studying the cross-talk, or interactions, between certain enzymes that regulate the production of inflammatory agents from dietary arachidonic acid. Excess synthesis of inflammatory molecules can lead to tumor formation and malignancy. Das is working with promising drug compounds that target the enzymes, reducing the production of inflammatory molecules.

"The inflammation-reducing compounds our laboratory is studying have potential as effective drug therapies for colon cancer."

—Siddhartha Das, Ph.D.

A Novel Approach

Compound may be effective in treating hormone-resistant cancers

Assistant Professor of Biological Sciences Marc Cox, Ph.D., is investigating a novel antiandrogen drug compound for the treatment of metastatic prostate cancer.

Patients with this disease are usually treated with hormone therapies aiming to lower androgen levels, a key stimulator of prostate tissue growth.

"These androgen-deprivation strategies may be effective in controlling disease for several years, but prostate cancers eventually develop resistance to hormone therapy, enabling tumors to progress," Cox said. "Patients with hormone-resistant prostate cancers have limited treatment options."

Annually, approximately 29,000 deaths are attributed to prostate cancer in the United States, according to the Centers for Disease Control and Prevention.

Thus, there is a need for effective anti-tumor drugs for hormone-resistant cancers. Cox's drug compound targets a novel molecular mechanism associated with the regulation of the androgen receptor. The drug compound shows promise as an effective and efficient inhibitor of the androgen receptor, with the possibility of less toxic side effects.

"These androgen-receptor inhibitors may also lead to novel drugs with applications in the treatment of prostate cancer."

—Marc Cox, Ph.D.

Screen Time

Investigator studies compounds' anticancer and antimicrobial properties

Biological Sciences Professor Renato Aguilera, Ph.D., an expert in cellular and molecular immunology, is leading efforts to test a large number of chemical compounds for anticancer or antimicrobial properties at UTEP's Border Biomedical Research Center.

Aguilera is director of the center's Cell Culture and High Throughput Screening Facility, which houses an array of state-of-the-art equipment that can test chemical compounds simultaneously on multiple organisms. In 2006, Aguilera was honored with a prestigious University of Texas System Stars Award of $480,000. He used those funds to purchase high-end instrumentation for the facility, including a high-throughput confocal microscope and a fluorescence-activated cell sorter. He also recently received funding through the 2009 American Recovery and Reinvestment Act to purchase an additional confocal microscope.

"The confocal microscopes allow us to scan sections of cells, from the bottom to the top, for instance, to create a 3-D image," Aguilera said. "Examining these stacks of images can show us in detail what effect a compound is having on a cell."

Aguilera has purchased large "libraries" of chemical compounds, which he is screening for anticancer and antimicrobial properties. A better understanding of the compounds' effects on cell structures could lead to improved, targeted drug therapies for various diseases, Aguilera said.

In addition to his research, Aguilera has earned recognition for his efforts to help minority students find success in the biosciences. Aguilera is director of the Minority Biomedical Research Support-Research Initiative for Scientific Enhancement (RISE) and Support of Competitive Research (SCORE) programs at UTEP. The federal programs bring millions of dollar in support to increase the number of underrepresented minorities in biomedical sciences and health professions.

Research Assets

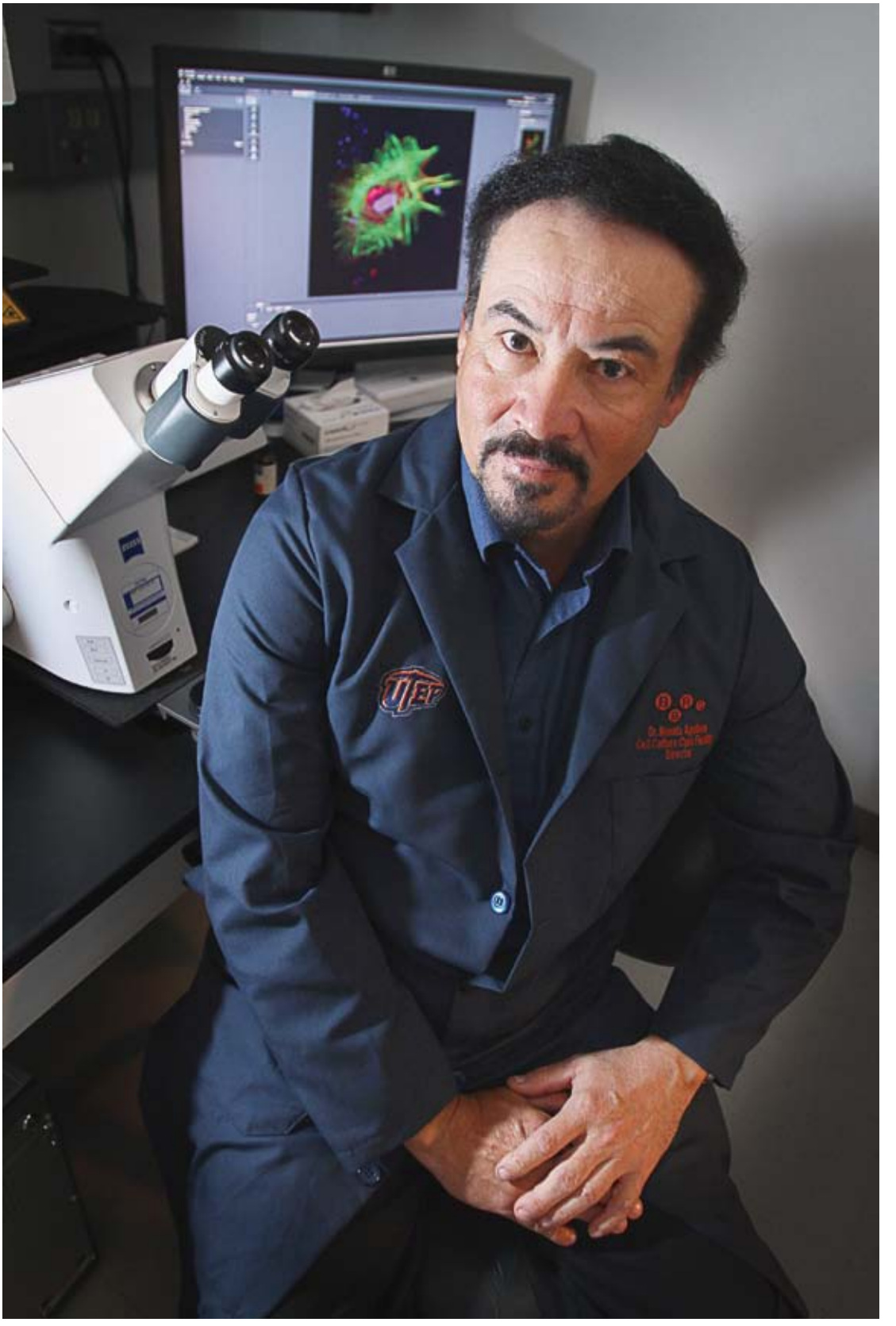
Border Biomedical Research Center
research.utep.edu/bbrc

Core Research Units
- *Toxicology*
- *Infectious Disease*
- *Neuroscience and Metabolic Disorders*

Core Research Facilities
- *Analytical Cytology*
- *Bioinformatics Computing*
- *Biomolecule Characterization*
- *Cell Culture*
- *DNA Analysis*
- *Statistical Consulting*

"The high-end equipment available to researchers in UTEP's Cell Culture and High Throughput Screening Facility is at a level of sophistication comparable with any major university in the U.S."

—Renato Aguilera, Ph.D.



Renato Aguilera, Ph.D.

THE BRAINPOWER BEHIND COMPUTER SIMULATIONS

Scientists and engineers are turning to high-performance computers to help address extremely complex challenges—searching for oil, improving earthquake prediction and analyzing weather, to name a few.

The computer simulations necessary for these studies require a specialized mathematical expertise—a discipline known as computational science.

UTEP's Computational Science Program, launched in 2008, offers master's and doctoral degrees in the field and is attracting a number of candidates with well-rounded mathematics and science backgrounds.

"Computational science draws people who not only have a computer science or mathematics background, but also people who are interested in biology, geology, mechanical engineering and other areas that use powerful computer simulations to solve problems," said Leticia Velazquez, Ph.D., associate professor and director of UTEP's Computational Science Program.

UTEP researchers have access to a number of high-performance computing machines and clusters on campus. As a member of the UT System, UTEP also has access to the Lonestar and Ranger supercomputers based at the Texas Advanced Computing Center at UT Austin.

As part of a true interdisciplinary program, research activities under the Computational Science Program's umbrella include studies of tectonics and structural geology, computer operating system adaptation and optimization, statistical bioinformatics and chemical simulations of materials.

"These kinds of projects are very important for UTEP, because many of today's research grants require interdisciplinary teams. Having this program can give us an edge to win those grant proposals."

—Leticia Velazquez, Ph.D.

On the Web: academics.utep.edu/compsci

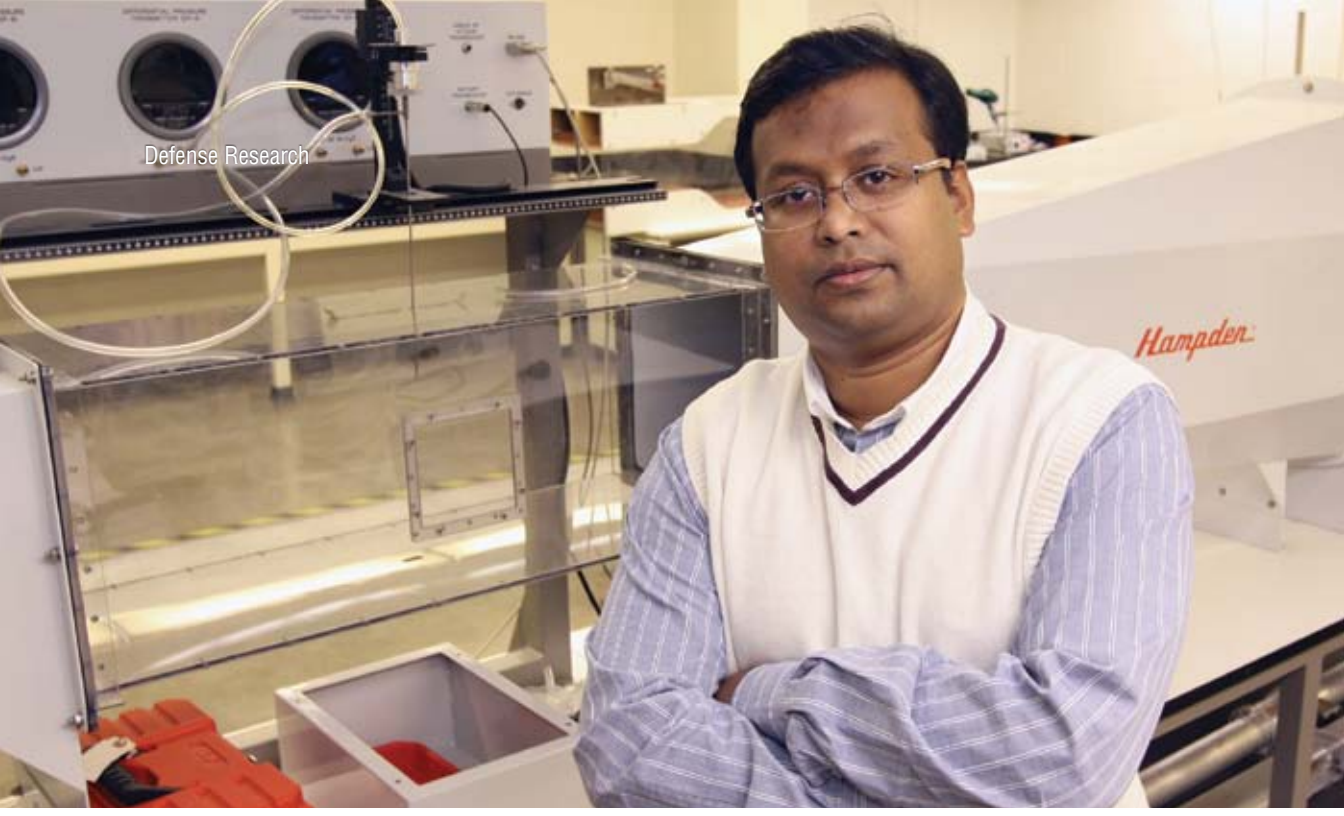
A LEADER IN DEFENSE, HOMELAND SECURITY AND AEROSPACE RESEARCH

For decades, the United States armed forces, the National Aeronautics and Space Administration (NASA) and private industry have tapped the expertise of UTEP scientists and engineers on some of the most challenging defense and aerospace-related projects.

The strong relationships between these agencies and the University have led to the establishment of a number of centers and laboratories that offer excellent research opportunities for undergraduate and graduate students. These facilities include the Center for Space Exploration Technology Research (cSETR), the Future Aerospace and Technology (FAST) Center, and the Research Institute for Manufacturing and Engineering Systems (RIMES).

Taking advantage of UTEP'S border location, adjacent to Fort Bliss and White Sands Missile Range, the University has strengthened its partnerships with government and industry through the UTEP Office of Strategic Initiatives, which oversees two important research centers on campus: the National Center for Border Security and Immigration and the Center for Defense Systems Research.

As faculty address important homeland security and defense issues, they also strive to offer the best research opportunities for their students. As the examples in this section illustrate, UTEP is leading the way in preparing minority scientists and engineers for successful careers.



Launching New Technologies

NASA Boosts Space Exploration Research at UTEP

In 2009, UTEP became one of only six universities in the U.S. to be selected by NASA to host a Center for Space Exploration Technology Research (cSETR). The new laboratory, directed by Associate Professor of Mechanical Engineering Ahsan Choudhuri, Ph.D., will be supported by a $5 million grant from the space agency.

The center will work closely with other NASA research facilities, including the Johnson Space Center in Houston and the White Sands Test Facility in Las Cruces, N.M., on advanced capabilities in environmentally friendly propulsion technologies and the use of natural resources on the moon and other planets to create spacecraft fuel and other materials. UTEP faculty from the College of Engineering and the Department of Geological Sciences in the College of Science will collaborate on research activities.

Choudhuri, an expert on aerospace propulsion and space system design, said UTEP is "at the right place with the right focus at the right time" for the development of the new center. "With the additional growth of the aerospace industry in southwestern Texas, as well as in southeastern New Mexico, UTEP's research capacity is expanding to meet the needs of this region."

"That's one of the big missions of cSETR—Hispanics are so underrepresented in these engineering areas. In the aerospace industry, the workforce is growing older, and those workers will eventually need to be replaced."
—Ahsan Choudhuri, Ph.D.

The award will provide 35 positions for graduate-level students to conduct research on the future of rocket engines, propulsion systems and propellants. In addition, a Master of Science degree in mechanical engineering with a concentration in aerospace engineering will be developed.

President Barack Obama, center, poses with the recipients of the Presidential Award for Excellence in Science, Mathematics and Engineering. Among the honorees is UTEP Professor Benjamin Flores, Ph.D., pictured in the back row, fourth from right.

A Researcher and Mentor

Engineering professor lauded for increasing minority participation

Benjamin Flores, Ph.D., a professor of electrical and computer engineering, is serving two important roles at The University of Texas at El Paso. As a researcher, he is an expert on radar technology. As an educator, he is renowned for his leadership in programs designed to produce successful minority scientists and engineers.

Flores' work with radar has led to the development of new signal-processing approaches to obtain images of targets such as military aircraft or even intercontinental ballistic missiles coming in through the atmosphere at high speeds.

The speeds at which these objects travel challenge current radar technology. Flores' research involves the use of microwaves to get a clear, focused picture of airborne targets. It can easily tell the difference between friend and foe and provides numerous other details such as size, shape and even the type of propulsion engines.

"These images provide accurate information that can be used to make smart decisions," Flores said. "For instance, mobilizing intercepting fighters can be an expensive proposition when a target is detected. Modern radar technology can be used to decide whether to just watch the target, or to dispatch the fighter. So the approach is also cost-effective."

For a number of years at UTEP, Flores also has directed the prestigious National Science Foundation Model Institutions for Excellence program and the UT System Louis Stokes Alliance for Minority Participation, initiatives designed to increase diversity in the science, technology, engineering and mathematics (STEM) fields. He was recently promoted to associate dean of the Graduate School and was honored by President Barack Obama at the White House on Jan. 6, 2010 with the Presidential Award for Excellence in Science, Mathematics and Engineering. The selection included a $10,000 award, which Flores will use for STEM education and mentoring programs in Canutillo, Texas, schools.

"It's an honor for my work to be recognized at the highest level."
—Benjamin Flores, Ph.D.

Research Assets

National Center for Border Security and Immigration
www.utep.edu/osi
- *Surveillance and tracking technologies*
- *Screening, scanning and inspection processes*
- *Unconventional security assessments*
- *Migrant population flows*

Center for Defense Systems Research
www.utep.edu/osi
- *Functional advanced manufacturing*
- *Miniaturized 3-D embedded sensors*
- *Software systems engineering*
- *Improving dependability through rigorous testing*
- *Visual sensing and image dissemination system for monitoring*

Future Aerospace and Technology (FAST) Center
- *Engineering research and test services*

Investigative Interviewing Research Laboratory
iilab.utep.edu
- *Eyewitness memory*
- *Detecting deception*
- *Interrogations and confessions*

Intelligence Community Center of Academic Excellence
- *Develops core skills in national security, intelligence, foreign area studies, language proficiency and geographical expertise*

Saul Gutierrez

Emily Rehmeyer

Sunay Palsole

UNIQUE PROGRAMS HELP STUDENTS THRIVE

With an eye for ensuring the success of their students, UTEP faculty are eager to incorporate fresh and innovative teaching techniques in classrooms and laboratories. Many of the ideas and resources spring from UTEP's Center for Effective Teaching and Learning, which assists faculty members in developing teaching materials and assessment tools and sponsors frequent workshops on the latest classroom practices.

More and more often, learning is taking place outside of classrooms, thanks to Web-based tools that bring together students from all over the world.

This is exemplified in many of the projects organized by UTEP's Office of Instructional Support Services (ISS), where a dedicated staff implements the latest technologies for teaching and research. ISS staffers recently assisted a biology professor in creating a virtual Galápagos Islands, where students conduct exercises designed to teach concepts in evolutionary biology.

Learning is also taking a fascinating interdisciplinary twist in UTEP's new Center for Science, Technology, Ethics and Policy. Through classes and workshops, scientists, engineers and philosophers debate and study complex ethical issues in their fields.

And in UTEP's Language Acquisition Research Laboratory, students get hands-on experience in all the tasks that seasoned researchers perform, from creating proposals to testing participants, transcribing and analyzing data, and presenting results and papers.

These are just a few of the inventive and engaging programs that help prepare confident, experienced UTEP graduates.

Miner Avatars

UTEP students get 3-D research experience

While many UTEP students experienced the movie *Avatar* and visited Pandora from behind 3-D glasses, these Miners teleport daily to an island in cyberspace known as Eve Galápagos.

At home in pajamas or tucked in a comfy chair at Starbucks, students in a UTEP distance learning course transform into field scientists, teleporting to an island in cyberspace to study how weather and the availability of food affects populations of birds.

The exercise teaches the students basic biological science, but it also represents the cutting edge of education today: learning through virtual worlds.

Known as Experience Virtual Evolution (EVE) Galápagos, the island was created by a team from UTEP's Instructional Support Services (ISS) office. Led by Director Sunay Palsole, ISS promotes the use of technology in teaching and learning. EVE Galápagos serves as the lab component of UTEP Adjunct Professor Michael Kolitsky's online Human Biology course.

Palsole, who has long been eager to introduce virtual worlds to the University curriculum, presented the idea of an interactive island to Kolitsky, who eagerly agreed to adopt it for his course.

Recent UTEP computer science graduate and ISS staffer Saul Gutierrez took on the task of building the virtual island using Second Life, a three-dimensional online community where residents are represented by their computer-generated selves, known as "avatars."

Once transported to EVE Galápagos, students explore the island's dry and rainy regions. They count populations of birds, identifying them by the length of their beaks.

"We're studying two things: microevolution—changes that you can measure over a short period of time—and natural selection," Kolitsky said. "During the drought, the grass seeds disappear and the birds with the long, thin beaks begin to decline. But the birds with the heavy, short beaks do well because they eat the seeds of the cactus, which handle drought much better than the grasses."

It's Second Life's potential for teaching science, engineering and other fields in an interactive way that has Kolitsky and his partners at ISS energized.

"What we are doing is a little edgy—our students were field scientists in a very real simulation," said Kolitsky.

"Our idea was to make the lab in this biology course a bit more interactive and interesting. And it also serves as a 'proof of concept' so that we may sometime in the future create many more virtual worlds for use in teaching at UTEP."

—Sunay Palsole

"It gives us a sense for what's over the horizon and how this technology will change the educational experience."

—Michael Kolitsky, Ph.D.

Research Assets

Center for Effective Teaching and Learning
academics.utep.edu/cetal
- *Faculty workshops*
- *Faculty development retreats*
- *Collaborative faculty mentoring*

Instructional Support Services
academics.utep.edu/iss
- *Online course design and management*
- *Student motivation and engagement*
- *Multimedia production*
- *Technical certification courses*

Center for Science, Technology, Ethics and Policy
cstep.cs.utep.edu
- *Interdisciplinary ethics courses*
- *Continuing education workshops for scientists and engineers*
- Young Scientists and the Ethos of Current Science *Web magazine*

The Center for Science, Technology, Ethics and Policy

Examining the moral implications of advances in science and technology

The opening of new frontiers in science and technology often leads us to a crossroad where we must stop and ask ourselves: Is what I am about to do right or wrong?

It is a critical question faced daily by scientists who manipulate genetic material, physicians faced with life-or-death decisions and engineers responsible for the safety of thousands of people who use roads, bridges, vehicles and buildings.

These are among the issues under study in the Center for Science, Technology, Ethics and Policy (CSTEP), established at UTEP in 2007.

Directed by Associate Professor and Chair of Philosophy Jules Simon, Ph.D., CSTEP unites UTEP researchers from a variety of fields for classes, workshops and student-led projects involving ethical studies.

"We bring together philosophy students and science and engineering students to discuss a number of important issues … for example, how do you manage end-of-life decisions? How do you manage publishing and copyright on the Internet?" Simon said.

Simon and Donna Ekal, Ph.D., associate provost of undergraduate studies at UTEP, developed and taught in fall 2007 the University's first-ever bioethics course, which continues to be offered in conjunction with the UTEP Medical Professions Institute. In the summer of 2008, Simon and Associate Professor of Computer Science Steven Roach taught a graduate-level "engineering and ethics" course. Also, Professor of Metallurgical and Materials Engineering John McClure coordinated a CSTEP-sponsored workshop for professional engineers on ethics and public policy in regard to bridge failures and bridge construction.

CSTEP also offers a student-produced online academic research journal, *Young Scientists and the Ethos of Current Science*. The publication is produced in conjunction with the North American Mobility Program, a consortium of nine universities from the United States, Canada and Mexico that brings together students interested in studying ethical and public policy issues in the sciences.

"It's what philosophers do best—help scientists and engineers think about the implications of their work."
—Jules Simon, Ph.D.

Steven Roach, Ph.D.

Donna Ekal, Ph.D.

John McClure, Ph.D.

Behind Bars

Studying the educational experiences of young prisoners

Three UTEP education professors who ventured into prisons to learn about the educational experiences of convicts have a better understanding of the importance of early-intervention programs for troubled youngsters.

Helen Hammond, Ph.D., and Lawrence Ingalls, Ph.D., both associate professors of educational psychology, and Assistant Professor of Special Education Robert Trussell, Ph.D., interviewed convicts who committed crimes at a very young age and were identified as having learning, behavioral and emotional disabilities.

"The goal was to see what was done and what wasn't done academically for these young prisoners who had committed rapes, thefts, murders and assaults," Ingalls said.

The researchers are preparing to publish the results of their study, which was conducted from 2000 to 2008. The prisoners were asked 10 to 15 questions about their educations and teachers.

They found that despite having emotional problems and a history of anti-social behavior, none of the convicts had been enrolled in special behavioral programs at his or her school. The prisoners reported that they had received assistance for their learning problems, but behavioral issues went mostly unaddressed.

Many prisoners said they felt that their general education teachers had "picked on" or discriminated against them because they had been labeled as students with "bad behavior."

When the prisoners were asked to describe their favorite teacher from their years in school, some consistencies emerged. The favorite was typically someone from an alternative schooling system, where the prisoners said they were better cared for. The class sizes were smaller, the instruction more intense and the expectations for success higher.

The investigations have led to two main recommendations for educating these at-risk youth. First, the youngsters should be placed in anti-social behavior programs before they reach eight years of age. Second, teacher training should be improved so educators are better prepared to deal with emotionally troubled students and avoid actions that appear to discriminate against the youngsters.

The researchers hope their study will be used to reduce the problems among young students with emotional difficulties and improve the quality of their lives beyond school.

"Appropriate intervention is the key," Ingalls said.

"If these (behavioral) issues are not addressed by the time the student is 8 or 9, they could become chronic, like a medical problem."
—Associate Professor of Educational Psychology Lawrence Ingalls, Ph.D.

Helen Hammond, Ph.D.

Project CHANGE

Children with autism need a great education

Assistant Professor of Special Education Robert Trussell, Ph.D., is looking to produce more teachers who are better prepared to work with students with autism spectrum disorders (ASDs).

Trussell is leading Project CHANGE, a program launched in January 2010 that offers 21 UTEP teaching students specialized training in the medical, functional and social needs required by children with ASDs.

ASDs are estimated to affect one in 150 United States children, and include autistic disorder, Asperger syndrome and atypical autism. The disorders are caused by a problem with the brain and affect social, emotional and communication skills.

Trussell said, "We have wonderful teachers in El Paso, but the expertise in autism is not there."

Funded by a four-year, $781,000 Department of Education grant, Project CHANGE will add an emphasis area in autism to the Master of Education in Special Education degree program. Because there is a significant demand for special education teachers trained in ASDs, Trussell wants to place more quality educators in that pipeline. He expects the program to support about 40 graduate students, each of whom will conduct research as part of the curriculum.

"Every student will do an original research paper that will be of local importance. For example, one student may study ways to reduce tantrum behavior through use of culturally relevant interventions. Another may study ways to reduce problem behavior through the use of positive social stories that include the student with autism," Trussell said.

Joe Villalobos, a special education teacher in the El Paso Independent School District, was accepted into Project CHANGE. As the father of a young son with autism, Villalobos understands that caring for and educating these students can be extremely challenging. He is enthusiastic about the new curriculum's focus on autism.

"I think this new plan is great," he said. "I know we're kind of like the guinea pigs."

Villalobos' research will focus on methods to help calm students who are throwing tantrums.

"We want to enhance the level of expertise and infuse our community, our education system with teachers who have the knowledge and skills to work with people with autism."

— Assistant Professor of Special Education Robert Trussell, Ph.D.

Language Acquisition

Laboratory builds research skills

The mission of the UTEP Language Acquisition Research Lab is much more than studying how children learn their native language as well as second languages. The LARLAB, as it is popularly known, empowers student researchers to design their projects from the ground up.

Graduate and undergraduate students are involved in all the tasks that seasoned researchers perform, from creating proposals to testing participants, analyzing data and presenting results.

"That's what is unique about this lab—our main goal is pedagogical," said LARLAB Co-Director Ellen Courtney, Ph.D., an associate professor of languages and linguistics. "This means giving the students the opportunity to learn how to become outstanding researchers through hands-on experience."

That was literally the case for graduate student Cliff Jones, who serves as the student director of the lab. Jones sculpted a clay lizard, dog and cat and brought them to life using Adobe Director animation software. The cute characters are the stars in an interactive computer program that Jones' research team is using to study children's ability to understand degrees of certainty in language.

LARLAB Co-Director Maria Blume, Ph.D., an assistant professor of languages and linguistics, is co-principal investigator on a project to create a Virtual Linguistics Laboratory under the VCLA (Virtual Center for the Study of Language Acquisition) that will train students to use new linguistics cybertools for research. The project is supported by an $896,000 National Science Foundation grant.

"El Paso is the perfect place to study bilingualism and the processes through which children acquire language."

—Associate Professor of Languages and Linguistics Ellen Courtney, Ph.D.

RESEARCH AIMS TO PROTECT AND PRESERVE OUR NATURAL RESOURCES

An international community of more than 2 million, in the midst of one of the largest deserts in North America, offers endless opportunities for study of the impact of human activity on nature.

UTEP's Center for Environmental Resource Management (CERM) provides the leadership to coordinate University resources on environmental research relevant to the Paso del Norte region, as well as many community outreach programs dealing with hazardous waste management and air and water quality.

CERM also manages the Rio Bosque Wetlands Park, representing an ongoing community effort to restore a portion of the Rio Grande's habitat to a condition that existed long before the river's water was appropriated for agricultural and domestic use.

The Rio Bosque project offers UTEP biology researchers ample opportunities to study wildlife and the effect of invasive plants on the river.

UTEP aims to be the leading resource on the water sources, the mountain ranges and all the other aspects of life in the Chihuahuan Desert. UTEP's Centennial Museum has developed an excellent online resource of Chihuahuan Desert information through its research arm, the Laboratory for Environmental Biology.

Special Collection

Laboratory for Environmental Biology specializes in Chihuahuan Desert's natural history

A variety of impressive displays at the Centennial Museum on the UTEP campus allows visitors to learn about the natural and cultural history of the Chihuahuan Desert.

But an even bigger treasure trove of information is available to researchers, thanks to the UTEP Laboratory for Environmental Biology, which shares a constantly growing body of knowledge about the Chihuahuan Desert through the museum's Web site.

The laboratory serves as the museum's research arm and offers searchable online databases of information about mammals, birds, insects and just about anything else in North America's second-largest desert.

Arthur Harris, professor of biological sciences and director of the laboratory, serves as the research liaison for the museum.

"The Web outreach in conjunction with the research mission of the Centennial Museum was started several years ago," Harris said. "It reflects our strength in research on the Chihuahuan Desert."

The museum's Web site may be one of the best, if not the best, one-stop resources of information about the Chihuahuan Desert anywhere in the world. In addition to databases for scientific researchers, the site contains articles and educational materials easily accessible for anyone. One popular section features photographs and descriptions of native plants, useful for homeowners who xeriscape and others eager to learn more about the myriad plant species in the surrounding desert. Harris also has contributed a section on vertebrates of the Pleistocene (Ice Age) Epoch.

Harris said the Web site serves to "educate as well as entertain," and is constantly evolving as UTEP researchers learn more about the Chihuahuan Desert's present and past.

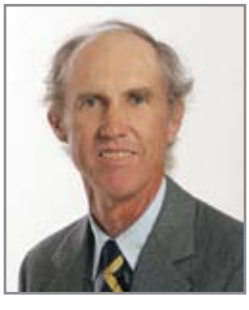
On the Web: museum.utep.edu

Rio Bosque

Unique 372-acre wetlands park offers environmental scientists numerous research opportunities

"It's our hope to inspire people, through education, to care for the natural resources we have in the Chihuahuan Desert."

—Arthur Harris, Ph.D.



"With the removal of the saltcedar, there is a dramatic change with the way the tornillo (screwbean mesquite) is colonizing all over the park."

—John Sproul

Only a half-hour's drive southeast of the campus, the Rio Bosque Wetlands Park is a 372-acre outdoor laboratory for UTEP biologists. Managed by UTEP's Center for Environmental Resource Management (CERM), the park was created in 1997. It arose from a community and government effort to restore the kind of wetland environment that existed along the Rio Grande before the river was channelized for agricultural and domestic water supply purposes.

The park is home to an abundance of flora and fauna. More than 200 species of birds, including several endangered and threatened species, have been observed at the wetlands. Researchers such as Vanessa Lougheed, Ph.D., assistant professor of biology and director of the Aquatic Ecology Laboratory, study the impact that invasive plant species, such as saltcedar, have on the wetland. The lab's scientists also are studying the effects of changing water deliveries to the park.

The park has provided the University with outstanding opportunities to engage the community in wetlands restoration projects. The Friends of the Rio Bosque, with help from numerous volunteer organizations, have worked for many years to clear away saltcedar from the park. Their dedicated efforts have paid off with the strong return of the native tornillo, or screwbean mesquite, shrub, said CERM's John Sproul, program coordinator and manager of the park.

"In a lot of areas, we've passed a threshold," Sproul said. "Now we've got these thickets of tornillos and a lot of resident birds have really taken to them," Sproul said.

Geological Sciences

UNDERSTANDING EARTH'S PHYSICAL, CHEMICAL AND BIOLOGICAL PROCESSES

With the Franklin Mountains to the east and volcanic peaks and craters to the west, UTEP is an ideal locale for geological researchers.

While there are plenty of opportunities for studies locally, UTEP expertise is sought all over the world. Projects include earthquake research based in Alaska, Guatemala and the Himalayas. Seismic studies also have taken UTEP researchers to countries in Eastern Europe, New Zealand and Libya.

Assistant Professor of Geological Sciences Bridget Smith-Konter, Ph.D., with support from the National Science Foundation, is making geological research easily accessible to the El Paso community. Two interactive computer kiosks will be installed on campus, featuring educational material on local and regional geological areas of interest.

In the laboratory, UTEP scientists now have access to a state-of-the-art mass spectrometer in the Center for Earth and Environmental Isotope Research, thanks to a National Science Foundation grant awarded to Assistant Professor of Geological Sciences David Borrok, Ph.D. The specialized machine, which identifies elements in rock and other materials, will create numerous interdisciplinary research opportunities.

Earthquake Aware

Project brings Earth science to the community

Students in the El Paso community will get a taste of earthquake research, thanks to a unique program led by Assistant Professor of Geological Sciences Bridget Smith-Konter, Ph.D.

Smith-Konter is studying the San Andreas Fault in California using global positioning system (GPS) data and analysis of prehistoric earthquakes in a sophisticated computer model she developed. The model could help scientists recognize patterns in earthquake activity over the past 1,000 to 2,000 years. The research will be incorporated into the EarthScope project, a leading large-scale community effort to understand the nature of earthquake hazards along the Pacific-North America plate boundary.

As part of the project, Smith-Konter is developing interactive computer kiosks at UTEP to increase community awareness of the project's research results, as well as local and regional EarthScope science activities. One of these kiosks is currently being installed in UTEP's Centennial Museum, and a second kiosk is planned for the entrance of the Geology Building.

"A significant component of this project involves development of educational tools and opportunities for K-16 teachers and students, while providing pertinent and accessible information to the general public," Smith-Konter said.

Her research is supported by a National Science Foundation (NSF) award of $500,000 through the foundation's prestigious CAREER grant program, which supports outstanding junior faculty members' efforts to integrate education and research.

The NSF also is supporting Smith-Konter's investigation of the lifting and subsiding motions of the Earth's crust using historical tide gauge measurements of coastal sea level and present-day GPS measurements of vertical crustal motions. The goal is to simulate the up and down movements of the crust due to seismic activity over the last 100 years.

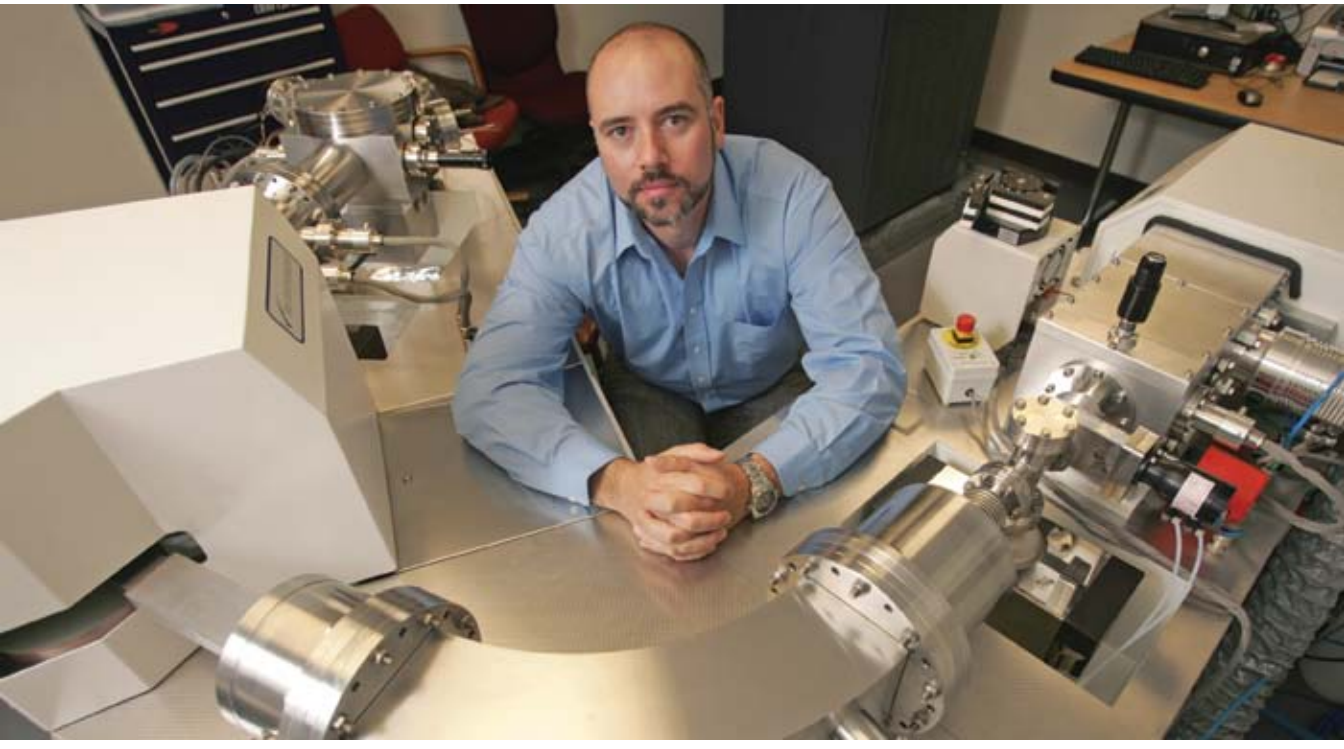
Smith-Konter also plans to investigate tectonic activity on Saturn's icy moon Enceladus and Jupiter's icy moon Europa. The project, funded by a NASA award, will focus on the development of models that simulate fault motions due to orbital interactions between each moon and its parent planet.

"The new Center for Earth and Environmental Isotope Research will greatly enhance the training and educational opportunities for faculty and students."

—David Borrok, Ph.D.

"We want to make people more aware of what Earth scientists are doing."

—Bridget Smith-Konter, Ph.D.



David Borrok, Ph.D.

Isotopic Investigator

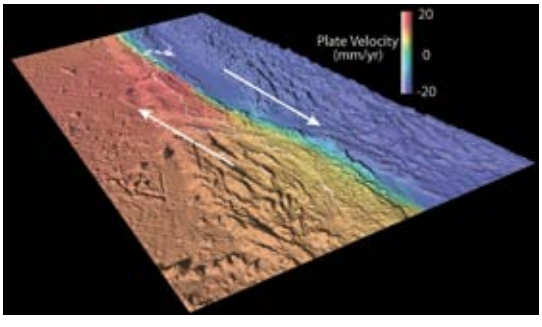
New mass spectrometer is one-of-a-kind in the region

UTEP geological sciences researchers have a new tool in their analytical arsenal: a specialized machine known as a multi-collector inductively coupled plasma mass spectrometer, or MC-ICP-MS. The spectrometer precisely measures the isotopic ratios—the fingerprints of elements—in rock, environmental and biological samples.

The purchase of the equipment was made possible with the help of a $524,000 National Science Foundation award secured by Assistant Professor of Geological Sciences David Borrok, Ph.D.

Borrok said the spectrometer is the centerpiece of UTEP's new Center for Earth and Environmental Isotope Research, and is the only one of its kind in a 500-mile radius. The equipment will provide a huge range of academic research opportunities, and just as many commercial uses. For example, agencies such as the Department of Defense and the FBI are interested in the forensic applications of isotopic measurements.

"There was a great need for (the spectrometer)," Borrok said. "This will open the doors to wonderful collaborative research opportunities."



Research Assets

Kidd Seismological Observatory
- *Five seismic stations in West Texas*
- *Each station is equipped with Kinemetrics TH-11 sensors*

Pan-American Center for Earth and Environmental Studies

research.utep.edu/paces
- *Data network for geological sciences research*
- *Archive of satellite and aircraft imagery*
- *Gravity and magnetic field data repository*

Regional Geospatial Service Center

gis.utep.edu
- *Maps and other geographic images and data for local emergency responders and Texas National Guard*
- *Web-based mapping services available to the public*

Magnolia Dela Cruz, UTEP physical therapy student *Celia Pechak, Ph.D.*

COMMUNITY HEALTH WORKING TO IMPROVE EQUITY IN CARE

Researchers in UTEP's College of Health Sciences and School of Nursing are driven by a desire to improve care for the Paso del Norte community.

That was the motivation behind Master's of Public Health candidate Hector Reyes, Jr.'s project to assess important health indicators in El Paso County's population. The result is a first-of-its-kind document that puts vital information at the fingertips of researchers and government policymakers.

At the School of Nursing, the Infection Control Center stays on top of the best ways to prevent the spread of disease, serving as a valuable resource in a world threatened by the new H1N1 influenza virus and increasing cases of illness caused by antibiotic-resistant bacteria.

Another major initiative is the Hispanic Health Disparities Research Center (HHDRC), a collaboration between UTEP and The University of Texas at Houston School of Public Health-El Paso Regional Campus. Established in 2003, the HHDRC works to find solutions to poor health outcomes and lack of access to care in certain population groups, such as minorities, the elderly and the poor.

How Healthy Are We?

Master of Public Health candidate Hector Reyes, Jr. authors a first-of-its-kind report for El Paso

Health disparities are often more pronounced among impoverished Texas border communities such as El Paso County than in other parts of the state.

But no one had a truly accurate, comparative snapshot of the county's well-being until Hector Reyes, Jr., a University of Texas at El Paso Master of Public Health candidate, spent hundreds of hours gathering data as author of *How Healthy Are We?*, a first-of-its-kind report on 22 measures of health in El Paso County's population.

Published this year, *How Healthy Are We?* reveals that El Paso County has the highest incidence of hepatitis A infections, the highest overall cancer mortality rate and the highest percentage of low-weight births among major Texas border counties.

Reyes authored the report as part of a master's program internship with the City of El Paso Department of Public Health.

"I have always had an interest in public health, and this was an opportunity to create something that would have a real benefit for the community," Reyes said. He spent hundreds of hours compiling statistics from the Centers for Disease Control and Prevention, Texas Department of State Health Services and other agencies with databases of health information on El Paso County. His hard work paid off in a document that provides health professionals, researchers and policymakers easy access to important measurements of community health.

How Healthy Are We? also assesses El Paso County's progress in attaining the goals of Healthy People 2010, a disease prevention and health promotion initiative launched in 2000 by the U.S. Department of Health and Human Services. Reyes' research revealed that the population of El Paso County meets just five of 21 national health objectives set by Healthy People 2010.

On the Web: How Healthy Are We? Selected Measures for El Paso, Texas 2008 *is downloadable from the City of El Paso Department of Public Health Web site at www.elpasotexas.gov/health.*

"City and county officials needed a document making important health data easily accessible to researchers."

—Hector Reyes, Jr., MPH candidate

Infection Control Center

School of Nursing brings together experts on disease prevention

The 2009 global outbreak of the H1N1 influenza virus and the increase of illness caused by methicillin-resistant Staphylococcus aureus (MRSA) bacterium are two sobering reminders of the need for effective education and research on infection control.

The UTEP School of Nursing has responded by creating the Infection Control Center, a University and community resource that taps the expertise of the University's health scientists, biologists and social scientists, to name a few.

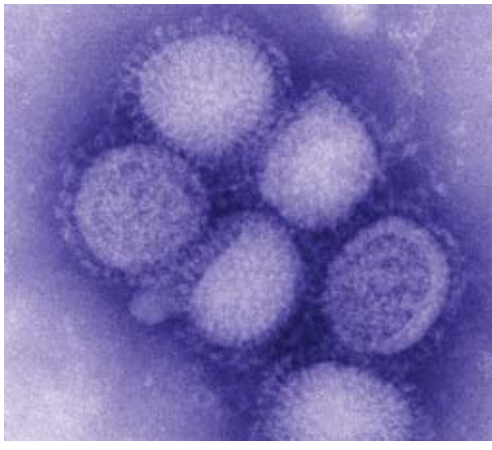
Launched in 2008, the Infection Control Center is directed by Assistant Professor of Nursing Velma McInnis-Edmonds, D.N.S.

The center's responsibilities include incorporating the best practices of infection control and disease prevention in the School of Nursing curriculum, as well as fostering increased involvement of faculty and students in infection-control research.

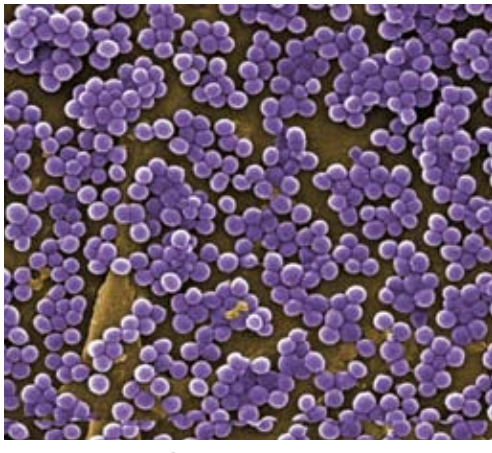
McInnis-Edmonds said a group of UTEP undergraduate students recently researched locally practiced infection control measures for MRSA and injection techniques.

"We found that practices are not necessarily consistent from facility to facility," McInnis-Edmonds said. "Having this kind of evidence-based knowledge can help the health care community develop better procedures for infection control."

The center also assisted the University in developing a response to the outbreak of the H1N1 virus in the Borderland. The center plans to build upon its outreach activities by opening the lines of communication between University experts and public health officials and developing a comprehensive plan of action in case of an infectious disease crisis.



H1N1 influenza virus



Methicillin-resistant Staphylococcus aureus (MRSA) bacterium

"The center fosters an interdisciplinary approach to infection control involving nursing, medicine, allied health, biology, social sciences and other fields."

—Velma McInnis-Edmonds, D.N.S.

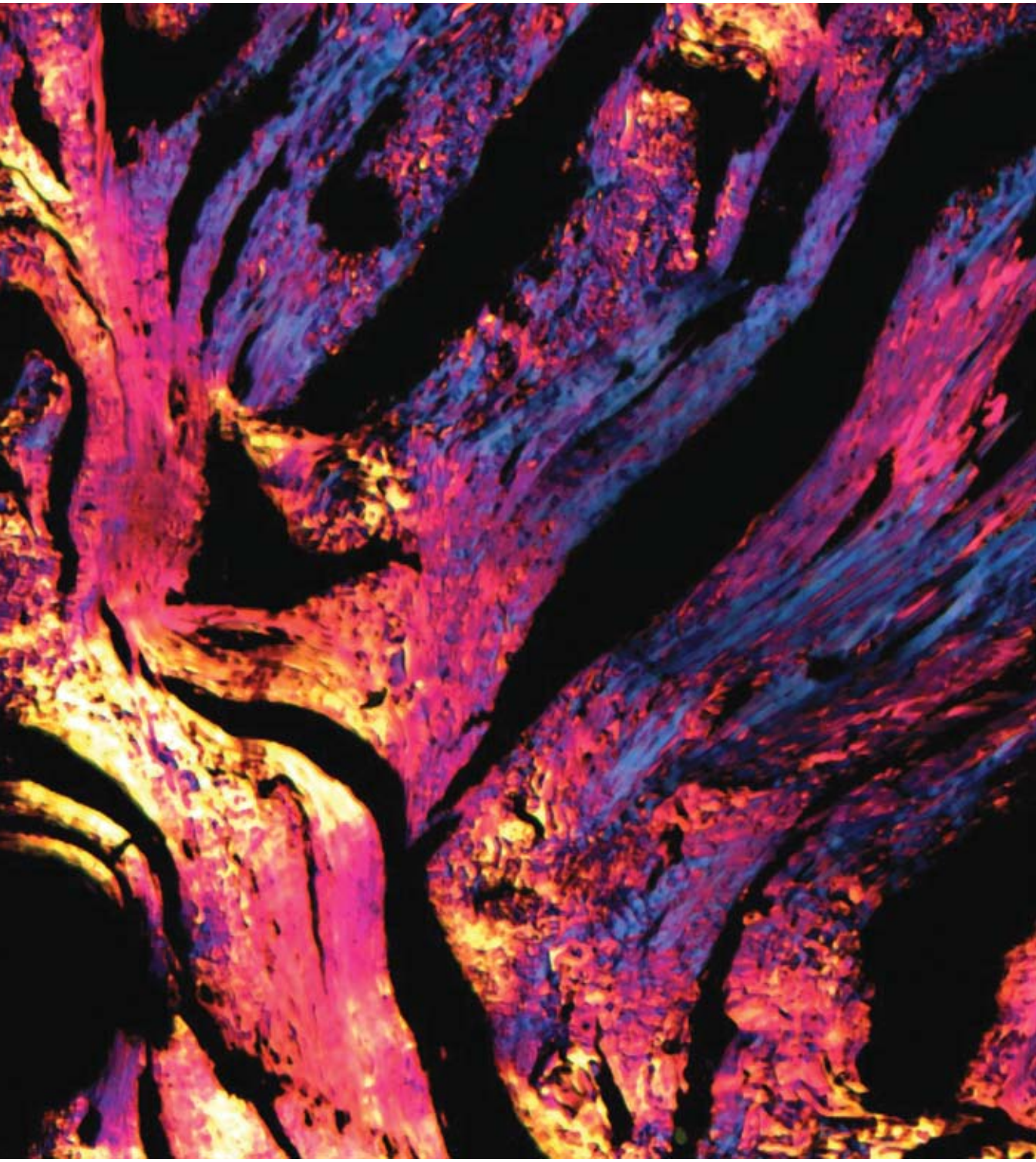
Research Assets

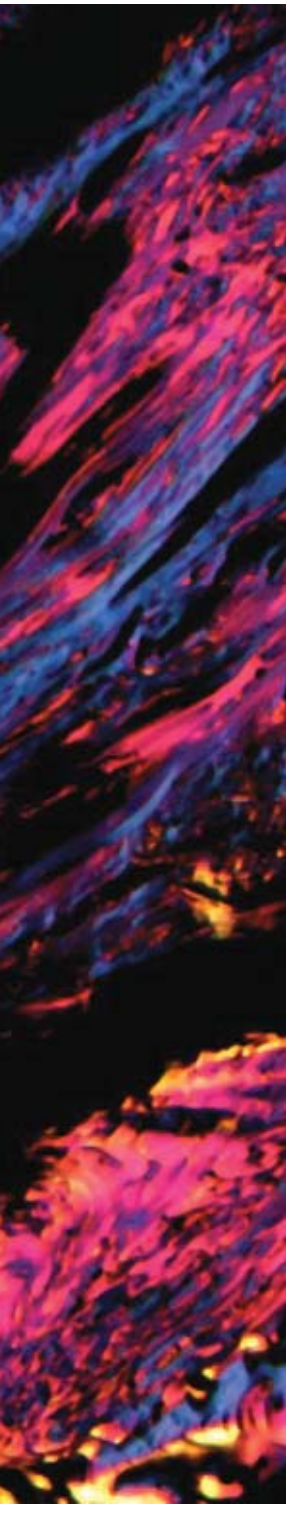
Hispanic Health Disparities Research Center
www.hhdrc.org
- *Border health research*
- *Training for minority researchers*
- *Research-to-practice dissemination*

UTEP Infection Control Center
nursing.utep.edu/infection_control_center.shtml
- *Infectious disease research*
- *Prevention and infection control activities*
- *Development of curriculum related to infection control*

TIES Partnership Program
chs.utep.edu/healthpromotion/ties-partnerships-program
- *Collaboration between UTEP and Universidad Autónoma de Ciudad Juárez*
- *Prevent, diagnose and control tuberculosis and related diseases*

Materials Engineering





MINING COMMERCIAL POSSIBILITIES

UTEP's expertise in chemistry, metallurgy and materials engineering is in high demand by industry and government agencies seeking innovative, high-tech solutions for real-world problems.

A number of projects have exciting commercial potential, such as Professor of Physical and Organic Chemistry Carl W. Dirk's patented light filter, designed to protect delicate works of art from photochemical damage.

Another technology with commercial possibilities is being studied by Lawrence Murr, Ph.D., professor and chair of metallurgical and materials engineering. Murr is using a special technique to fabricate high-performance thermoelectrics, devices that create electricity from heat.

The Air Force Office of Scientific Research has tapped mechanical engineering Professor Arturo Bronson, Ph.D., and Associate Professor Jack Chessa, Ph.D., to develop materials that can resist ultra-high temperatures and hypersonic speeds.

UTEP works to build strong relationships with industry and government partners through a number of centers and laboratories, such as the Research Institute for Manufacturing and Engineering Systems, which takes an interdisciplinary approach to solving complex engineering problems.

Carl W. Dirk, Ph.D.

"Potential commercial applications include heat-capture devices on roadways or in deserts that can power lights or signage."

—Lawrence Murr, Ph.D.

Shockwave Fabrication

A unique approach to high-efficiency thermoelectrics

Lawrence Murr, Ph.D., professor and department chair of metallurgical and materials engineering, is exploring an unusual way to fabricate thermoelectric materials: with an explosion's shockwave.

Thermoelectric materials are semiconductors that turn heat into electricity. It's a wonderful concept, but the technology has been relatively inefficient and expensive compared to other means of generating electricity. This is because fabrication methods that melt or compact thermoelectric powders limit interparticle bonding, and the result is a low-efficiency material.

Murr's unique approach to making high-performance materials involves a patented device that uses a safe, controlled explosion to create a shockwave that consolidates thermoelectric nanopowders without melting them. Interparticle bonding is maximized, creating high-performance thermoelectrics.

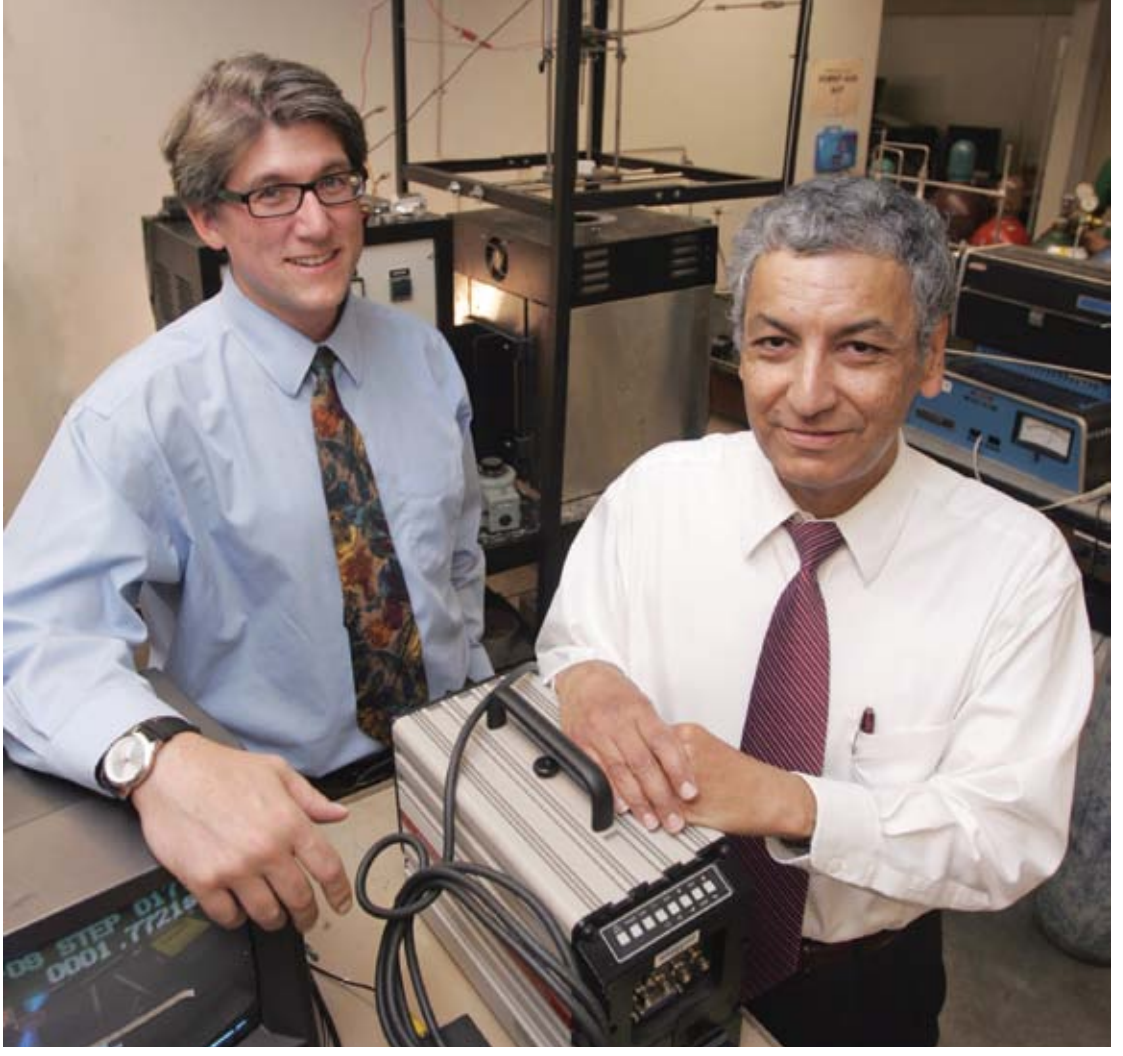
"It's the only way we know of to create a solid without melting the material," Murr said. "You change the properties of the material if you heat it up and melt it. We need the material in a solid form without melting it."

Murr's research is supported by a grant from El Paso-based TXL Group, Inc., a manufacturer of thermoelectric materials and devices.

The technology holds exciting potential for a number of applications, including the fabrication of small electricity-generating devices for satellites and space probes. High-efficiency thermoelectrics can also be used in some industries to convert waste heat into electricity, helping reduce energy costs.

"This is a joint effort that will help dictate the material development. With us working together, we're trying to push the envelope."

—Jack Chessa, Ph.D.



Jack Chessa, Ph.D. *Arturo Bronson, Ph.D.*

A Material Partnership

Mechanical engineers join forces to speed the development of ceramic composites

UTEP mechanical engineering researchers Arturo Bronson, Ph.D., and Jack Chessa, Ph.D., are investigating materials that could be used in spacecraft and other vehicles exposed to ultra-high temperatures and hypersonic speeds.

Chessa, an associate professor of mechanical engineering who is an expert in computational mechanics, is designing ceramic materials that can withstand temperatures above 3,000 degrees Fahrenheit. By working together, Chessa and Bronson expect to significantly reduce the time it takes to produce these unique materials.

Often, the development of these kinds of state-of-the-art composites can take as long as 30 years to go from the laboratory to a marketable product.

"Historically, this is the domain of materials scientists," said Chessa. "They go into the lab and create something and then have to run experimental tests to characterize the materials. It takes years to develop … and commercialize them."

By working together, the professors believe they can shave the commercialization time down to 10 years.

"In the past, experimentalists, like myself, would find a new material and then take it to someone like Chessa," said Bronson. "So we turned it around. We're doing the computational mechanics first, and then he will tell me what I need to create to better design the material. So, in essence, instead of me driving him, he's telling me what to do in the lab."

Bronson and Chessa's research is supported by a $350,000 award from the Air Force Office of Scientific Research.

Temperature Rising

Navy turns to special alloys to extend jet engine longevity

Metallurgical and Materials Engineering Professor Shailendra K. Varma, Ph.D., and his research group are helping the Office of Naval Research investigate materials that could improve the performance and cost-effectiveness of jet engines.

Navy researchers are studying metals that have better heat resistance than nickel-based alloys, which are widely used in jet and gas turbines and can withstand temperatures around 1,000 degrees Celsius. They are particularly interested in alloys containing the rare element niobium, which has a high melting point and improves the strength of steel. Niobium-based alloys hold promise for effectively operating in temperatures of 1,500 degrees Celsius.

"Alloys that can operate at these temperatures will help improve the efficiency of engines, making them last longer and ultimately reducing operating costs," Varma said.

Varma's role in the Navy's investigation focuses on understanding the resistance of niobium-based alloys to oxidation at high temperatures. His present project is supported by a $900,000 grant from the Office of Naval Research. This, and an earlier $1 million grant from the ONR, helped purchase special furnaces capable of producing temperatures up to 1,500 degrees Celsius and other high-end equipment for characterization of materials by both transmission and scanning electron microscopy.

Varma's project is representative of many research opportunities at The University of Texas at El Paso–his team consists of both undergraduate and graduate students.

"The research grant support also serves an important purpose—to train undergraduate students who will pursue higher studies and possibly careers in the Navy research laboratories," Varma said. "These students get the opportunity to present their work at national and international conferences—and get published in refereed journals."

Research Assets

Research Institute for Manufacturing and Engineering Systems
rimes.utep.edu
- *Model-based systems engineering*
- *Reliability analysis*
- *Risk analysis*

NanoMaterials Integration Laboratory
research.utep.edu/nanomil
- *Semiconductor materials and devices*
- *Nanoscale and millimeter-scale assemblies*

Computational Mechanics Laboratory
utminers.utep.edu/jfchessa/Lab/index.html
- *Fluid structure interaction*
- *Solidification modeling*
- *Modeling of friction stir welding*

"We are part of an effort to find an alloy that will resist temperatures up to 1,500 degrees Celsius. These kinds of materials could be used in a wide range of applications, including jet engines and gas turbines."

—Shailendra K. Varma, Ph.D.

Transportation

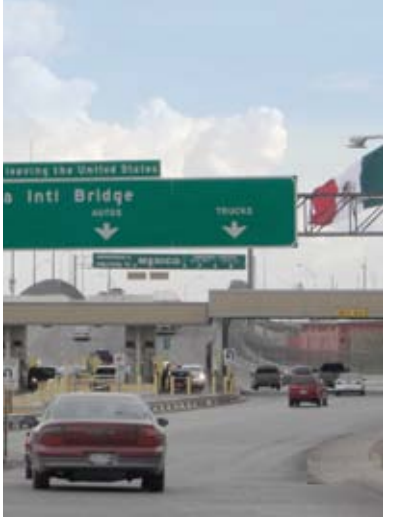
Research Assets

Border Intermodal Gateway Transportation Laboratory
www.utep.edu/biglab
- *Domestic and international movements of vehicles, people and freight*
- *Emergency service operations and transportation security*

Center for Transportation Infrastructure Systems
ctis.utep.edu
- *Materials, design and construction*
- *Transportation planning*
- *Instrumentation*
- *Nondestructive testing*

"By performing surveys on potential customers, companies and border commuters, we can gauge the potential of the carsharing market here and propose a carsharing system for El Paso."

—Kelvin Cheu, Ph.D.



CARSHARING CONCEPT

Transportation alternative could benefit El Paso

A research team led by Associate Professor of Civil Engineering Kelvin Cheu, Ph.D., is examining the potential for carsharing as a transportation alternative for El Pasoans.

Carsharing is a fairly new concept in the United States. A city, company or other organization takes ownership of a fleet of vehicles, to which drivers can subscribe. Carsharing customers pay a monthly subscription fee, plus time and distance charges, and can pick up and return vehicles to designated stations without prior notice. The fleet-owning organization, meanwhile, is responsible for vehicle cost, maintenance and insurance.

Major cities such as Washington, D.C., San Francisco, Chicago, Boston and Austin already have carsharing companies with growing market shares and profits. Cheu, director of the College of Engineering's Border Intermodal Gateway (BIG) Transportation Laboratory, believes the concept could catch on with Paso del Norte residents.

"What is particularly unique to our city is that we regularly have commuters who cross the border," said Cheu. "Carsharing may be attractive to them because instead of waiting two hours at the bridge, they can just walk across, pick up a vehicle, and drive in El Paso."

Carsharing could offer an eco-friendly benefit as well, Cheu said.

"The tendency is that if you buy your own car, you drive more," said Cheu. "But if you drive a carsharing vehicle, you tend to plan your trips more carefully, save gasoline and help the environment."

Cheu's study of carsharing's potential in El Paso is funded by the Texas Transportation Institute.

Programs Inspire New Researchers

ATTRACTING TALENTED STUDENTS TO SCIENCE AND ENGINEERING FIELDS

UTEP is proud to be involved in a number of efforts to recruit and retain new researchers, particularly minorities and others who have been traditionally underrepresented in the STEM fields of science, technology, engineering and mathematics.

This page highlights a few programs that are inspiring the next generation of researchers.

Cyber-ShARE

The UTEP Cyber-ShARE Center conducts innovative cyberinfrastructure research to advance education and interdisciplinary science and engineering collaborations. Cyber-ShARE promotes diversity through educational outreach programs aimed at underrepresented middle and high schoolers and their teachers.

El Paso T-STEM Center

The T-STEM Center assists math and science teachers in developing high quality curriculum and instruction programs to ensure high academic achievement in mathematics and science in K-12 students.

Intelligence Community Center of Academic Excellence

The Intelligence Center's mission is to prepare students of all backgrounds for positions in the intelligence community. Graduates become proficient in the study of national security, intelligence, foreign area studies, language proficiency, geography and related competencies.

MBRS-SCORE

The Minority Biomedical Research Support and Support of Continuous Research Excellence (MBRS-SCORE) programs at UTEP take an interdisciplinary approach to solving health problems, while increasing the number of underrepresented minorities in biomedical sciences.

Medical Professions Institute

The Medical Professions Institute is an award-winning program that prepares students for medical, dental, veterinary, optometry and physician assistant careers. Students are given assistance in preparing for professional school tests, such as the MCAT. They also gain valuable experience volunteering in clinics, shelters and other nonprofit organizations.

Pathways to the Geosciences

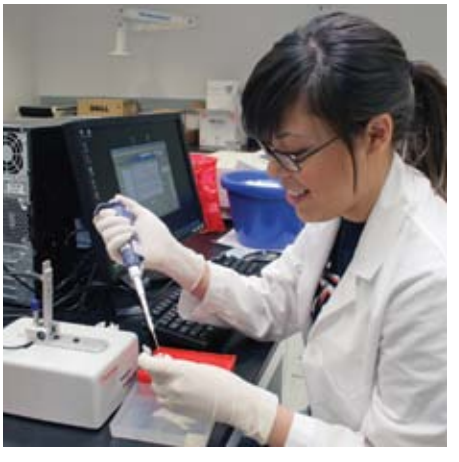
The Pathways program seeks to increase the number of Hispanic students who earn undergraduate and graduate degrees in the geosciences. Pathways brings together high school students and teachers in a summer research experience designed to introduce the geosciences and their connections with other disciplines such as biology, chemistry and physics.

RISE Scholars

The Research Initiative for Scientific Enhancement (RISE) program provides stipends to qualified students in biological sciences and engineering to perform undergraduate research. The students are paired with a faculty mentor during the research experience.

UT System LSAMP

The Louis Stokes Alliance for Minority Participation (LSAMP) program seeks to increase the number of underrepresented minority students pursuing careers in science, technology, engineering and mathematics careers. At UTEP, the LSAMP's Bridge to the Doctorate initiative provides 12 minority students with scholarships to pursue their doctorates.



Future Facilities of UTEP Research Programs

Scheduled to open in spring 2011, the College of Health Sciences/School of Nursing building is a $60 million, 130,000-square-foot facility that will include classrooms, simulation laboratories and research space. The heart of the facility will be a 16,000-square-foot center where students will train using interactive patient mannequins.

UTEP's new Chemistry and Computer Science Building is expected to open in 2011. The $70.2 million building will feature 140,000 square feet of classroom and laboratory space.

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