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On the cover: The immigration scholarship of SMU Political Science Professor James Hollifield is attracting international attention. See article on page 16.

Cover photo by Hillsman S. Jackson
Doctoral programs and faculty research distinguish comprehensive universities from liberal arts colleges and community colleges. The most recent Carnegie classification of higher education institutions places Southern Methodist University in the Doctoral/Research Universities (Extensive) category. To enhance SMU’s academic reputation, increasing the quality and quantity of the doctoral output and sponsored research activity is essential. I am happy to note that we are on the right track for both efforts.

Two new Ph.D. programs, in Chemistry and in Civil Engineering, will begin in fall 2004. Sponsored research volume has increased 85 percent—from $7.42 million in 1992 to $13.7 million in 2003—and it already has crossed the $15 million mark for 2004.

Sponsored research activity depends on faculty. Because of the diverse nature of schools at SMU, only a fraction of the faculty is able to secure funding from outside sources. For example, less than 14 percent of the 535 full-time faculty received sponsored research awards in 2003 (see article on page 26). Programs receiving at least $100,000 in awards are Anthropology; Biological Sciences; Chemistry; Geological Sciences; Mathematics; Physics; Psychology; Statistical Science; Computer Science and Engineering; Electrical Engineering; Engineering Management, Information and Systems; Environmental and Civil Engineering; Mechanical Engineering; and Education. Of these 14 programs, five stand out with faculty members who have secured in the past five years more than $1 million each in aggregate research funds: Richard Jones, William Orr, and Steven Vik in Biological Sciences; Thomas Chen and Gary Evans in Electrical Engineering; Eugene Herrin and Brian Stump in Geological Sciences; Radovan Kovacevic in Mechanical Engineering; and Ryszard Stroynowski in Physics.

In each program several faculty members contribute to the overall volume of sponsored research. Some probably will become “big hitters” in securing external funding in the coming years and will join those previously mentioned. Some departments also have made recent faculty appointments—Patricia Mathes in Education and Ernest Jouriles in Psychology—who will become strong contributors to sponsored research.

While expressing this optimism about the state of research at SMU, I would be remiss if I did not extend my gratitude to all researchers on behalf of the University.

Finally, a personal note. As many are aware, I am resigning from this position at the end of May and will retire after a year. I am proud to have guided the growth of SMU Research in the past 12 years—from its inception to the current volume. It has become an authentic record of ongoing research at SMU—both sponsored and unsponsored—and I leave it to my successor to improve upon it.

I thank the Office of Public Affairs for producing and publishing the magazine. Also, I thank all well wishers who support research at SMU.

Sincerely,

U. Narayan Bhat
Dean of Research and Graduate Studies
Stabilizing Properties

Department of Chemistry faculty have discovered a new way to stabilize reactive forms of manganese—a fairly common metal symbolized by “Mn” on the periodic table—on cheap and readily available solid supports such as clays.

Research conducted by Associate Professor David Son, Professor Mark Schell, and Adjunct Professor Raj Vempati has selectively stabilized three different states of manganese that are characterized by different colors. The most highly reactive form of manganese, called Mn(VII), can be attached to clays or convert the manganese already present in clays to Mn(VII). When either process is performed, the clay becomes violet in color.

“The significance of this discovery is that we now have a safe and cheap source of a highly reactive material,” Son says. “The Mn(VII) does not come off the clay in either water or nonaqueous solvents, and you can handle it freely. We have demonstrated the utility of this material by removing malodorous compounds from water. This process is rapid and does not contaminate the water. Furthermore, this material is very effective in polishing various metals including silver, copper, brass, and pewter.”

The researchers, who hope to market this material as a malodor removal agent and as a cleaning agent, have applied for a U.S. patent.

International Collaboration

The Department of Computer Science and Engineering is developing a program with the University of Tunis El Manar to reduce the shortage of computer science faculty members in Tunisia. The Tunisian Ministry of Higher Education projects that by 2010 the nation’s universities will need 1,100 computer science faculty members. The U.S. Department of State is supporting the two-year program with a $100,000 grant.

Under the program, eight computer scientists from Tunis will spend up to a year at SMU conducting research, visiting local industry, and examining SMU’s computer science curriculum. Four CSE faculty members from SMU also will visit the University of Tunis during the next two years to give lectures, evaluate curriculum, and explore avenues of further collaboration. SMU also will offer training on technical entrepreneurship to the Tunisians.
Gold! Tale Of A Lost Civilization

In the foothills near Florence, Italy, archaeologists from SMU, the University of Pennsylvania Museum of Archaeology and Anthropology, and Franklin and Marshall College have uncovered gold artifacts from an ancient Etruscan city. The Etruscan civilization thrived for hundreds of years during the first millennium B.C. before being assimilated by the Romans.

Little is known about the Etruscans because researchers have found only scattered ruins. The site at Poggio Colla, however, is the most extensive settlement that is archaeologically accessible today, spanning over 50 acres and revealing a wealth of information about daily Etruscan life.

The gold discovery is significant because the riches were not buried in tombs, says Greg Warden, SMU archaeologist and co-director of the Mugello Valley Archaeological Project, which oversees the excavation. "The discovery of these gold objects in this ordinary setting is unprecedented in Etruscan archaeology," he says. "Poggio Colla is a complex site. We've dug only one small part, and we anticipate more exciting finds to come."

For more information about Poggio Colla, including other sources for Etruscan culture and images of the site, access smu.edu/underthetuscansun.

How Safe Are Nanoparticles?

Researchers are beginning to question the safety of manufactured nanoparticles, routinely used in industrial, medical and personal care products. In a study led by SMU environmental toxicologist Eva Oberdorster, juvenile largemouth bass exposed to one type of nanomaterial for 48 hours induced significant brain damage in the fish. This is the first time that a negative impact has been shown by manufactured nanomaterials in an aquatic species and could indicate potential risks in people exposed to the particles.

Acknowledging the rapid-onset of brain damage in the bass, Oberdorster says it is essential that these materials be further tested to assess the risks and benefits of this new technology before its use becomes even more widespread.

Researchers worldwide are only beginning to test manufactured nanoparticles for signs of possible toxicity, but it may be years before any reliable human data are available.

"There are many potential benefits of nanotechnology, but its hazards and risks are poorly understood. This study gives us additional cause for concern," Oberdorster says.

The New York Times Technology Section ran an article November 3, 2003, on nanoparticles and their potential toxicity, quoting Oberdorster.
Two projects are underway that will strengthen SMU’s programs in the School of Engineering and Dedman College of Humanities and Sciences.

The Department of Mechanical Engineering and the Department of Environmental and Civil Engineering soon will be housed in a new three-story, 50,000-square-foot building. A gift of $7.5 million from alumnus J. Lindsay Embrey Jr. and his wife, Bobbie, will help to construct the building, which will be located near the Jerry R. Junkins Engineering Building in the East Quad.

The second project will provide improved safety, a new organic chemistry lab, and refurbished lecture halls as part of the $11.8 million renovation of Fondren Science Building. The new chemistry labs will nearly double the hooded research area, enabling students to conduct more experiments.

Ethics Under Analysis

Behind the story of the 33-hour surgery to separate conjoined 2-year-old Egyptian twins was a team of medical ethicists who debated for six months the question about whether they should be separated at all. Tom Mayo, associate professor in Dedman School of Law, chairs the ethics committee for Children’s Medical Center of Dallas, which grappled with questions surrounding the case.

Mayo, a nationally recognized expert in health care law, was interviewed about the ethics of the case by NBC “Nightly News,” the “Today” show, the Associated Press, The New York Times, and The Dallas Morning News. He has written more than 20 scholarly articles and book chapters on such subjects as the legal implications of AIDS, abortion, right to die, neurosurgical ethics, medical futility, pediatric end-of-life care, health care fraud and abuse, surrogate parenting, and patient rights.

In addition to teaching at SMU, Mayo is an adjunct associate professor of internal medicine at the University of Texas Southwestern Medical Center at Dallas.

Cool Electronics

Vladimir Ajaev, assistant professor of mathematics in Dedman College, has received a $130,768 grant from the National Science Foundation to conduct research on the next generation of heat pipes—small devices used for cooling electronics such as laptop computers and mobile phones.

“Reducing the size of laptops requires more efficient means for removing heat from the processors, and current designs of heat pipes and other cooling devices are not quite up to this task,” Ajaev says. Solving the problem by using microscopic heat pipes has been discussed in the literature but was never implemented, in part because of difficulties in understanding the underlying physical phenomena on the very small scale involved, he says.

The three-year collaborative NSF grant features experimental and theoretical studies aimed at resolving various issues in developing efficient and reliable micro heat pipes and providing guidelines for the design of such devices.

Library With Style

The personal library of the late Stanley Marcus, internationally renowned fashion retailer and Dallas civic leader, has been given to SMU’s DeGolyer Library. Marcus’ wide-ranging curiosity is reflected in his collection of books on art, art history, literature, the book arts, business history, and fashion. Highlights among 10,000 books include Lyndon B. Johnson’s autobiography with a personal note tucked in the pages, a book of Ogden Nash’s poetry with an unpublished poem inscribed to Marcus, and an Italian inscription from Sophia Loren in her cookbook. The collection also includes first editions of works by William Faulkner, H.L. Mencken, Sinclair Lewis, and F. Scott Fitzgerald, as well as fine examples of the printed word from every century. The collection, which filled three libraries in the Marcus home, is the most significant bibliographical gift made to DeGolyer Library since its founding in 1974.
Digging New Mexico

Each summer since 1996 Associate Professor of Anthropology Michael Adler has directed a team of SMU students and volunteers in the excavation of Chaves-Hummingbird Pueblo in central New Mexico. Adler, who was named a 2004 Ford Research Fellow, will use some of the $15,000 award to continue field work and artifact analysis at the site. Excavations have yielded 30,000 artifacts deposited during the occupation of this Pueblo settlement in the 13th and 14th centuries. In addition, the research team has uncovered wall tops of 250 rooms, connected in a large, apartment-like structure, at the site.

For more information:
http://www.smu.edu/sem/hummingbird

Groundshaking Research in China

SMU Professor of Geological Sciences Brian Stump is overseeing the installation and operation of 16 seismic monitoring stations in the Yanshui-Huaihai Basin in China. The equipment installation was done in cooperation with Institute of Geophysics, China Seismological Bureau and supported by the PASCAL Instrumentation Center of the Independent Research Institutes in Seismology (IRIS). The study focuses on the Yanshui-Huaihai Basin because of historical earthquake activity in the area and the large population in nearby Beijing. In addition, underground mines in the area regularly experience rock bursts and collapses.

For more information:
http://www.smu.edu/geology/stump.htm
Interpreting Primal Christianity

Some New Testament references to women, especially in the Pauline letters, can seem old-fashioned at best and sexist at worst. In I Timothy, for example, the writer admonishes women in the Ephesian church to “learn in quietness and full submission,” “not to teach or have authority over a man,” and “to be silent.”

Some scholars have suggested that such passages were written for specific groups and circumstances and do not convey the fundamentally egalitarian character of early Christianity. This spirit of equality is more accurately represented by Galatians 3:28: “There is neither Jew nor Greek, slave nor free, male nor female, for you are all one in Christ Jesus.”

But Jouette Bassler, professor of New Testament in Perkins School of Theology, however, argues that to speak in terms of “gender equality” — males and females distinct but equal — imposes 21st-century convictions upon a first-century text. The Greco-Roman culture viewed gender as a spectrum of qualities instead of a dichotomy between male and female, she says. “Each human body comprised male and female aspects, and depending on the relative strength of these aspects, each individual would be located at a specific point along the male-female axis,” Bassler states in her paper “The Problem with Self-Definition: What ‘Self’ and Whose Definition?” to be published by University of Notre Dame Press.

These insights, Bassler says, may provide a better explanation for the phenomena hinted at in the New Testament letters: Christian women were speaking out, exercising leadership, and sharing claims to greater perfection and rational-
Mixing Signals

Whether attempting to reduce muffler noise in automobiles or demonstrating how recording artists enhance their sounds in the studio, Scott Douglas claims that his work is about having fun with signals.

Douglas, associate professor of electrical engineering in the School of Engineering, devotes his research to both dampening sound and isolating it. His home field is adaptive filtering, and much of his work focuses on noise abatement, specifically in active noise-control systems. Such systems work by producing sounds that are out of phase—different in frequency and other key properties—with the sounds to be eliminated, rendering both sounds inaudible. Douglas has developed the most efficient algorithm available for phase-matching in digital noise-control systems.

Active noise control has many applications in environments such as factories where traffic flow is very important. “You don’t want to put up physical sound barriers because that will limit movement,” he says. Numerous consumer electronics applications are available, as well; any company that makes headphones usually makes an active noise-control version for use on airplanes.

The technology does have its limits. For example, most applications do not work well above a frequency of 500 Hz; as a point of reference, most speech intelligibility is found at 1 kHz. “We’re not going to build cone-of-silence systems any time soon,” Douglas adds. “People who think they’d be able to have a quiet back yard next to a freeway with a system like this are likely to be disappointed. However, in applications with an enclosed space or a controlled environment, you have possibilities.”

Douglas also conducts research in blind-source separation, which can "unmix" sounds such as individual voices from other voices and background noise. The human ear has “the ability to understand what one person in a crowd is saying and isolate the meanings the person is creating with their words and voice,” he says. “Can we build an artificial system to do that? Can we build an unstructured sensor array that can pick out individuals in a crowd?”

Such technology has applications in security and in hands-free telecommunications such as speaker phones.

As associate director of SMU’s Institute for Engineering Education, Douglas also gives lectures on technology “as it relates to things people care about,” he says. A part-time professional singer, sax player, and pianist, Douglas credits music with introducing him to engineering.

Douglas, who joined SMU in 1998, received his M.S. and Ph.D. degrees from Stanford University. He was named a Ford Research Fellow in 2003.

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Redefining Reading

Patricia Mathes has devoted her nationally recognized research career to this discovery: Reading difficulties in young children can be overcome.

Named the 2002 Interpretive Scholar by the American Educational Research Association, Mathes conducts research that shows all students can become competent readers, even if they are predisposed to learning difficulties, she says. "They just need more carefully designed, explicit, hard-hitting instruction."

Mathes joined SMU in 2003 as the Texas Instruments Endowed Chair in Reading Research. She is structuring the new Institute for Reading Research to develop special curricula, instructional tools, and teacher support for K-3rd graders with dyslexia and other reading challenges. A former high school teacher, Mathes and her team will partner with public schools to offer a reading intervention program that helped first graders in eight Houston schools whose reading levels were in the 18th percentile or below. The program decreased the amount of failure to .02 percent of the research sample.

Supported by a $6 million grant, Mathes and her colleagues are broadening the scale of the program to 5,000 public school students in Dallas and Austin areas to study the program's potential effectiveness in the school system. The grant came from the Inter-Agency Educational Research Initiative that includes the National Institutes of Health, National Science Foundation, and the U.S. Department of Education.

The program provides special teacher instruction and support and a scientifically developed curriculum that offers alternative ways of explaining traditional reading concepts, such as long and short vowels, Mathes says.

After following the sample of students in Houston through second and third grades, Mathes found that some students slipped in their improvement but never fell as far behind as they were before receiving the intervention. "We saw the most results with kids who were truly dyslexic," she says.

"Scaling Up Effective Early Reading Interventions" is one of four projects that have received a total of $10 million during 2003-04 for research at the Institute and for teacher training at the Center for Teacher Education in SMU's Division of Education and Lifelong Learning. Researchers also are developing a computer assessment test to help teachers track growth in the reading development of all students and in areas ranging from phonics to comprehension. Mathes' research in bilingual reading education uses interventions similar to those successful in Houston for native Spanish-speakers learning to read in English. For bilingual students, Mathes and her colleagues are researching immersion versus transition in teaching English reading to native Spanish speakers.

The Institute also has received a $200,000 grant from Texas Instruments to test the Learning Enrichment Activities Program (LEAP) in preschool centers in the Carrollton/Farmers Branch Independent School District near Dallas. An interactive early childhood reading enrichment program, LEAP is being randomly assigned at the teacher level to compare its effectiveness with current curricula.

Mathes, named Early Career Researcher in 2001 by the Council for Exceptional Children, received an M.Ed. in educational psychology from the University of Houston and a Ph.D. in education and human development from Vanderbilt University.

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Mastering Musical Desire

World-renowned cellist Nathaniel Rosen is learning new works to play this summer at the memorial concert of a Japanese cellist who died last year. The cellist’s widow asked Rosen to perform the same repertoire played by her husband - once a student of Pablo Casals, one of the 20th century’s greatest cellists. Rosen calls them “old-fashioned pieces,” the kind that Casals played in the early 1900s.

“I like learning new pieces,” says Rosen, who has spent nearly 50 years studying and playing the cello. “They not only shed a different light on the pieces I already know, but they also keep me young.”

For Rosen, teaching cello to SMU students also keeps him sharp. The greatest challenge, he finds, is instilling patience in young musicians eager to perform their art without fully mastering technique. But for Rosen, true virtuosos not only master bowing and fingering skills in precise fashion, but also exhibit “musical desire,” what he considers a key element in talent.

“When you play an instrument, there are two lines happening simultaneously - what you are playing and what you are imagining,” he says. “To play a musical phrase, you have to have that phrase in your imagination – that is your desire and you make it real,” he says. “This takes technique and desire to do that - this is where most people fall short.”

Rosen, who joined Meadows School of the Arts in 2002 as an artist in residence, is something of a virtuoso himself. He gained national recognition at age 28 after winning the 1977 International Naumburg Competition, and international stardom the following year when he became the first American cellist to win the gold medal at the Tchaikovsky International Competition. He began studying the cello at age 6 with Eleonor Schoenfeld in his native California; at 13 he began his training with the legendary Gregor Piatigorsky. In 1970 Rosen made his New York debut as winner of the Piatigorsky Award given by the New York Violoncello Society. While attending the University of Southern California School of Music, from which he received his Bachelor of Music degree in 1971, he became a founding member of the Los Angeles Chamber Orchestra and, three years later, its principal cellist.

Throughout his career, Rosen has been a guest soloist with the world’s foremost orchestras, including those in New York, Los Angeles, Dallas, and London, among others. He also served as principal cellist with the Pittsburgh Symphony and has appeared on “The Today Show,” “Evening at Pops,” and other television programs.

His discography includes “Bach’s Suites for Violoncello Solo” for John Marks Records.

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Prosecuting Capital Crimes

The Nuremberg Trials of the late 1940s proved that the world could take judicial action for war crimes against individuals - not only the countries they served. Similarly, the International War Crimes Tribunal today is prosecuting former Serbian dictator Slobodan Milosevic.

But SMU international legal scholar Kofi Afele-Kale would like to expand this authority to prosecute economic crimes. Specifically, he wants to target officials who steal money from the countries they serve, the kind of grand-scale theft that plunges their citizens into perpetual poverty. Kofe-Kale’s vision: Strip these political leaders of diplomatic immunity and try to recover the country’s precious resources.

“You find that poor countries that are most in need of capital are the ones losing capital through their own leaders,” says Kofe-Kale, professor in SMU Dedman School of Law. “We have scandalous stories of presidents maintaining bank accounts in the billions of dollars,” he says.

These crimes involve the funneling of funds from developing countries to banks in Switzerland or other willing nations where private institutions hide the money. Such theft strips countries of financial assets that otherwise could support health care, education, debt relief, and other needs.

Unfortunately, these acts can be much more difficult to prosecute than high-profile, headline-grabbing war crimes.

“My idea is to persuade international law to recognize that these were crimes that bore individual responsibility - as much as Hitler’s henchmen were held accountable for the sad events that took place in Nazi Germany in the 1930s and ’40s,” Kofe-Kale says.

Kofe-Kale argues that the United Nations must take the lead because countries that have been through financial trauma have no resources to combat it, much less recover millions or billions in stolen funds. To build his case, the professor has been combing the constitutions and laws of developing countries to determine if they have rules against these crimes.

The United Nations cited Kofe-Kale’s work last year when it adopted a convention against corruption, codifying his ideas. Ninety-nine nations have signed the convention, which is open for signature until next year.

Kofe-Kale, who grew up in the African nation of Cameroon, says his research is the culmination of his earlier work as a political scientist, which examined the poverty of leadership in postcolonial Africa.

“I wasn’t interested in why people steal,” he says, “but in the consequences of that type of theft and how to stop it.”

Kofe-Kale, who has taught at SMU since 1989, earned his Ph.D. and J.D. degrees from Northwestern University.

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Bad News For Fraudulent Managers

Recent accounting scandals at companies such as Enron, Arthur Andersen, and Global Crossing have caused many in the public to lose faith in corporate America. With stock prices on shaky ground and top executives leaving with lucrative deals, managers who manipulated earnings or committed accounting violations seemed to be rewarded rather than held accountable.

As it turns out, however, those who managed their companies into the ground actually might be held accountable. Recent research conducted by Hemang Desai, associate professor of accounting in Cox School of Business, says the perception that managers are not suffering consequences for committing accounting fraud does not reflect what is happening.

In a paper co-authored by Desai, Chris Hogan of SMU, and Mike Wilkins of Texas A&M University, research showed that managers who manipulate earnings or commit generally accepted accounting principles (GAAP) violations are held accountable. Studying corporate America during 1997-98, they tracked senior managers under whose management companies were forced to issue earnings restatements or corrections. Of those companies, 60 percent dismissed at least one of their top managers. But even more significant was the finding that of those dismissed top managers, 80 percent failed to find a comparable job for four years.

"Once a company is discovered to commit a GAAP violation, a board reacts decisively to dismiss management," Desai says. "Further, the labor market imposes severe penalties on these managers."

In addition to his research on earnings restatements, Desai has studied the performance of corporate spinoffs. He found that when companies spin off a subsidiary that is unrelated to the parent's core business, the performance of each improves.

"Firms that stayed focused on their core business actually benefited," improving operating efficiencies, which led to higher stock prices, Desai says.

Desai, born and reared in India, came to the United States 16 years ago to pursue graduate studies. He received his Ph.D. at Tulane and joined SMU in 1997. He teaches undergraduate accounting and mergers and acquisitions in the M.B.A. program.

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Virtual Healing

A cancer patient in Dallas needs a medical opinion from a specialist in New York City. Because he is too ill to travel, much less endure hours in an examining room, his options seem limited. But new technology can allow a surgeon to physically examine a tumor in virtual reality from anywhere the Internet can reach.

“We’re working to create images you can touch without even making an incision,” says Yildirim Hürmüzlüt, professor of mechanical engineering in the School of Engineering. Hürmüzlüt’s work in robotics has led to a collaboration with the Radiological Sciences Department at the University of Texas Southwestern Medical Center at Dallas, as well as to his ongoing work with Edmund Richer, his former Ph.D. student and now a UT-Southwestern faculty member.

The key to their collaboration is the well-established field of ultrasound technology. Making an ultrasound scan is like throwing a ping pong ball—in this case, a sound wave—letting it bounce back, and measuring the speed at which it returns. The speed of return depends on the medium, because sound travels at different velocities in air, water, and oil. With this data, scientists can determine the density of the object being measured.

Hürmüzlüt and Richer have designed a system that uses a haptic interface—a virtual-reality mechanism worn around the arm and hand—in conjunction with a computer medium constructed with ultrasound data. The haptic device allows physicians to feel pressure sensations from computer images.

“When doctors look at scans of tumors and such, they can only see that information, not feel it, and there’s so much information they can get from touch,” Hürmüzlüt says. “Research indicates that doctors can determine the malignancy of a tumor by feeling how stiff it is. The stiffer it is, the more malignant it can be. There’s no way they can tell that by looking, but they can palpate it virtually.”

The benefits for patient care are self-evident, he adds. “Suppose a patient is in Dallas, and a world-renowned specialist is in New York,” he says. “Instead of sending the patient there and putting him or her through a lot of agony and expense, a scan can be sent through the Internet that the doctor can examine. This way, the doctor can take the time to really palpate and poke and push. If a doctor does that with human beings, that can cause a lot of pain. So if doctors don’t subject them to that prodding, they’re helping them already.”

Hürmüzlüt is writing a proposal for the National Science Foundation; if the NSF funds the work, he and Richer will begin building the devices.

Hürmüzlüt, who specialized in robotic locomotion during his Ph.D. studies at Drexel University, says the technology offers another important application in a vastly different field—that of oil well management. “When you get oil from a well, it comes in a mixture of water, oil, and gas,” Hürmüzlüt explains. “And it’s very difficult to know what percentages you have of each. If you’re pumping an oil well at the end of its useful life, you’re pumping more water than anything else. This ultrasound technology can tell you when the oil is getting low in a specific well.”

This “smart well” technology has the potential to create big cost savings for energy producers, he adds. “Field managers can see the status of a whole reservoir at once. It’s much more economical to focus on a network of wells rather than one at a time.”

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Waging War On A Mysterious Syndrome

When Abilene ranch hand Chris Yarger returned home in 1991 after fighting in the Persian Gulf War, he began to experience fatigue, nausea, loss of balance, joint and muscle pain, and memory loss. His symptoms have been identified as Gulf War Syndrome, but the mystery of what causes it and how it affects the brain remains unsolved.

Professors in SMU's Department of Statistical Science are working with Dr. Robert Haley, chief of epidemiology at the University of Texas Southwestern Medical Center at Dallas, to develop statistical methods to analyze Gulf War Syndrome research data. A $400,000 grant from the U.S. Department of Defense supports their research.

Haley, who graduated from SMU in 1967, began investigating Gulf War veterans' illnesses in 1994. His team published three papers in the Journal of the American Medical Association in 1997 tracing veterans' illnesses to deep brain structure damage. The syndrome was linked to exposure to sarin nerve gas and pesticide-containing flea collars worn by veterans, as well as the effects of anti-nerve gas tablets. Haley conducted further research comparing sick and well veterans with an exhaustive series of brain function tests. The tests included a brain scan study that examined the rates of blood flow in all areas of veterans' brains using single photon emission computed tomography (SPECT).

SMU statistics professors Richard Gunst, William Schucany, and Wayne Woodward are helping to interpret the data. "We are using sophisticated statistical methods never used in this area before," Schucany says.

"The analysis of this data is very complex." Haley says. The SPECT scans collected data from 200,000 locations within the brain, but because each person's brain is slightly different, pinpointing and comparing the areas of the brain that show damage is extremely difficult, he says.

The 1980s were a time of major advancement in brain science and in brain imaging, Haley says. The techniques for statistically analyzing three-dimensional brain images, however, are not as advanced.

"The SMU statistics professors have brought a high degree of rigor to the project and developed important innovations for how brain imaging scans are analyzed," Haley says. Scientists from the Department of Neuroscience at the University of Texas at Dallas also are analyzing the data.

Researchers predict a fruitful outcome to their collaboration. Two SMU statistics Ph.D. candidates have begun dissertations related to the project and graduate students meet with professors to discuss the research, furthering their knowledge of biostatistics, a booming field for statisticians. A leading scientific journal has accepted for publication a paper describing the first breakthrough from the collaborative work.

"We are moving into a relatively new area of science where the use of statistics is rapidly expanding," Gunst says. "We know we can make an impact and push our own discipline ahead by innovative computing and novel statistical modeling."

Other researchers at UT Southwestern are closely following the team's progress, Haley says. Better understanding of deep brain activity could be useful to scientists studying schizophrenia or Alzheimer's disease, among others.

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ith an estimated 175 million people living outside their countries of birth, immigration has emerged as one of the most contentious issues in world politics today. Based in part on economic and security concerns, scholars and government officials alike are asking these central questions: Who does the United States let in? and What status is accorded them?

Twenty years ago academia largely ignored the subject of immigration. But one political scientist recognized it as an emerging field of research where he could leave his mark. Today James Hollifield, the Arnold Professor of International Political Economy and director of international studies in Dedman College, who joined the SMU faculty in 1996, is considered one of the foremost scholars on immigration policy and politics. His ideas have moved from academic journals to center stage in international policy forums.

“When I began researching immigration in the 1980s, it was not a major field of study, especially in political science and government,” says Hollifield, also director of SMU’s John G. Tower Center for Political Studies. “By the mid-90s, however, many scholars had discovered this field.”

GLOBAL INFLUENCE

Hollifield’s pioneering study of immigration and his expertise in European affairs have attracted the attention of international bodies, including the World Bank, the Organization for Economic Cooperation and Development (OECD), the International Labor Office, and the United Nations, among others. He helps such organizations understand how governments regulate migration, focusing on economic development.

Last year, shortly after the United States declared war on Iraq, Hollifield gave the keynote address on issues of migration control and regulation in Europe at a conference organized by Polish and German officials and scholars at the University of Warsaw. The war highlighted the urgency of developing workable policies on immigration and security. Despite Defense Secretary Donald Rumsfeld’s controversial remarks about the “Old and New Europe” and some conference participants being at odds over the war, Hollifield’s speech received a standing ovation.

Hollifield also participates in immigration issues and policies in North America. “The Ethics of Immigration Policy: Seeking the Common Good,” hosted last April by the Tower Center, brought together immigration scholars and experts from the United States, Mexico, and Canada to discuss problems of border control and status and rights of immigrants and refugees.

In addition, the Tower Center is conducting a project on North American integration. Hollifield worked with SMU Professor of Economics Thomas Osang to produce a paper about the effects of NAFTA on trade and migration for a conference in Ottawa, co-sponsored by the Institute for Research and Public Policy in Montreal.

The movement of peoples brings both benefits and risks to democracies.

OPENING THE DOORS

The United States experienced a long period—from the late 1940s until the 1970s—during which immigration reached historically low levels because of tough immigration laws based on national origins. In 1985 the United States ended its strict national origin quota system, opening new avenues for immigrants, especially for families. Today, the easiest way to immigrate to the United States, according to Hollifield, is through family ties to a U.S. citizen. Despite the easing of quotas, immigration remained at low levels, due in part to the energy crisis and major recession of the 1970s.

During the 1980s, however, the U.S. economy rebounded and was restructured with an emphasis on information technologies over manufacturing. Job opportunities attracted unskilled and skilled labor from Mexico, India, Africa, and China. Congress passed a law in 1986 granting amnesty to illegal immigrants, and several million more immigrated to the country.

In 1990 Congress updated the law regulating
COMING TO AMERICA

By Meredith Dickenson and Joan Jackson

SMU Political Scientist Attracts International Recognition for His Immigration Scholarship
“300,000 people a year come to the United States illegally.”

Later he earned an advanced degree from the Institut d’Etudes Politiques in Paris. Having spent some of his formative years in Europe, he is fluent in French and also speaks Spanish and a modicum of German. After teaching philosophy in a high school gifted and talented program in North Carolina, Hollifield earned his Master’s and Ph.D. degrees in political science from Duke University.

Hollifield is the author and editor of 13 books, including his most recent, *The Emerging Migration State.* He co-authored *Migration Theory* with SMU Anthropology Professor Caroline Brettell, and *Pathways to Democracy* with SMU Political Science Professor Cal Jillson.

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**INTERDISCIPLINARY TEAM STUDIES IMMIGRATION IN SUNBELT CITY**

A three-year $445,000 grant, one of the largest ever given by the National Science Foundation in the field of cultural anthropology, is funding a comprehensive study of immigrants in the Dallas-Fort Worth metroplex.

Headed by Caroline Brettell, chair of SMU’s Anthropology Department, the interdisciplinary research team includes James Hollifield, professor of political science; Dennis Cordell, professor of history and associate dean for general education at SMU; and Manuel García y Griego, professor of political science and director of the Center for Mexican American Studies at UT-Arlington.

The research includes in-depth interviews with members from the Mexican, Vietnamese, Asian-Indian, Salvadorian, and Nigerian communities, plus a large random telephone survey. It looks at factors that attract immigrants to the area and how well they have been incorporated into the labor market and the community.

“This is a systematic effort to document diversity that now characterizes the whole metroplex,” Brettell says. “We hope this will teach people who live in Dallas more about the complexity of the populations that live in their city.”
"There is nothing so permanent as a temporary worker."

legal immigration to include the H-1B category addressing worker shortages, particularly in the high technology industry. The category allows qualified foreign workers to engage in temporary professional employment in the United States. Employers can recruit and hire foreign workers, particularly in areas where there are no qualified American workers, for an initial period of three years. Fees paid by employers support a training program to upgrade skills of domestic workers. However, the Bush administration has proposed eliminating the training program in 2005.

HOW OPEN SHOULD WE BE?

Hollifield writes about the inherent conflicts in a free society that arise from immigration. The movement of peoples brings both benefits and risks to democracies. "There is a great pressure legally, politically, and from a security standpoint to make sure you have some control over your borders," Hollifield says. "The paradox comes, not on the political side, but on the economic side because what makes the United States powerful and strong, and a great nation, is we are open and diverse. Economists say, 'Let's not have any borders, let markets decide. Migration should be like free trade; let's have free migration.' This is the view of The Wall Street Journal, for example. But politically and legally that's not possible, so governments are always trapped in this paradox: How open should we be?

"Historically if you bring people to work in a country, there is a very high likelihood that they will want to settle," he says. "There is a saying that 'There is nothing so permanent as a temporary worker.' About 300,000 people a year come to the United States illegally. Of these, half have crossed the border clandestinely. The other half come here on tourist or temporary visas and simply overstay or decide not to leave."

SUNBELT ATTRACTION

The immigration culture of older cities like New York, Chicago, Los Angeles, and even Miami is deeply embedded in the American psyche. Less is known, however, about migration to newer global cities such as Dallas-Fort Worth, Atlanta, and Phoenix that have emerged in the past decades, Hollifield says.

To gain more information about immigration issues in the Dallas area, Hollifield directs a group of native Vietnamese-speaking SMU students conducting research on their Vietnamese community. Jason Shung, a President's Scholar and international studies and economics major, helped the team conduct the research, funded by the National Science Foundation (see article on page 19).

The study interviewed 100 first-generation immigrants each in the Vietnamese, Asian-Indian, Salvadoran, and Nigerian communities, as well as 200 immigrants in the Mexican community. "We're trying to make sure that we touch every dimension of the community, from the bottom end of the labor market to the top end," Hollifield says.

Researchers are gathering information on their occupations, income, education, and language skills. They also want to know if the immigrants participate politically, have become naturalized, are citizens, and how integrated they are in their churches, community organizations, and institutions. In addition, they want to find out why immigrants come to Dallas rather than stay in New York, Chicago, or L.A.

"Dallas is growing because of immigration, and has become a great multicultural city," Hollifield says.

FROM THE FARM TO EUROPE

Hollifield grew up inside the boundaries of a national forest in western North Carolina. His father, wary of intellectuals and academia, wanted him to stay home and work in the family cattle business. "I came out of a rural, country high school. In the end, with the encouragement of my mother and the help of a scholarship, my father agreed that it was better for me to go to college. Going to Wake Forest University was a big intellectual step for me."

A letter from his country church minister helped earn Hollifield
a powered wheelchair and is operated with a simple flip of a switch.

In each of the past seven years, the final examination for senior mechanical engineering students has been to design devices for people with disabilities. Students begin with the customer need, interviewing the disabled for a design idea that could be applied to improve their lives. Eventually, the design process produces a working prototype for use in the real world.

Last year students’ projects also included:

- The Off-Road Para-Chair, an All-Terrain Vehicle with a special chair, which is capable of holding someone with a disability safely and securely while in the rugged outdoors. Hunting or fishing has been inaccessible to many disabled individuals because maneuvering through terrain on a wheelchair is not possible.

- The Access-a-Pack, a device that eliminates hard-to-reach backpacks mounted behind wheelchairs. The storage unit carries articles behind the user, but does not require him or her to twist around or exert great effort.

- The DollieLift, capable of lifting persons off the floor and placing their bodies at a height that enables them to stand up using their own strength.

- The Easy-Trans, a transfer aid to assist disabled drivers from their wheelchairs into the driver’s seat of their cars.

The projects, which cost about $5,000 each to develop, have been funded by grants from the Kent Waldrep National Paralysis Foundation and the United Service Association For Health Care Foundation.

“It’s been really rewarding to see these kids respond – the creativity they’ve demonstrated and the eagerness to learn about the issues,” says Kent Waldrep, founder of the foundation that bore his name. Waldrep, a former running back for TCU, was paralyzed in 1974 while playing in a game. His foundation, which was based in Addison until it closed in July, focused on raising funds for research on spinal cord injuries, but he eagerly responded when SMU asked him in 1997 about providing financial support for the seniors’ projects.

The design course, a culmination of the seniors’ previous three years of engineering education, emphasizes teamwork. All projects include need analyses, design specifications, budgets, and scheduling, giving students firsthand knowledge about the design process. In addition, while conducting their research, students interact with the disabled customer, adding a human side to their design projects.

“The purpose of the course is to teach product realization. But we discovered that we get a bonus – students become very sensitized to how engineering can affect the well-being of people,” says Paul Packman, professor emeritus of mechanical engineering and former director of the projects program.

“Through this process we’re trying to show them that the things they have learned in school do have a basis in reality, that they can be applied directly to making people’s lives better.”

Packman says his only disappointment is that the designs have not reached the commercial development stage because of intellectual property and product liability issues. He is hoping that the devices may find a possible market through Kent Waldrep, who since closing his foundation has started Waldrep Medical, which matches persons with disabilities with products and services they need. In addition, Packman is trying to expand the design program by developing a consortium with other Texas colleges and universities.

Lana Montgomery Couch, president of United Service Association For Health Care Foundation, believes that the students have gained more than design know-how in the course. “We are very proud to be linked with and support a project of this caliber that promotes engineering skills, empathy, research, and vision in designing products for the disabled,” she says.
Engineering Students Create Devices to Help the Disabled

For many, rain can be a nuisance but usually nothing to avoid. But how do individuals with disabilities maneuver their wheelchairs and hold an umbrella to remain dry? Ultimately few can, and many opt to stay indoors rather than get wet.

A group of mechanical engineering students at SMU thought such options for the disabled unacceptable. In a senior design class last year, the students created several devices for the disabled, including The UnderCover Canopy, an automatically deployable/retractable umbrella or rain cover that attaches to...
compare deep brain regions of normal individuals with those of individuals who might have abnormalities that impair cognitive or physical activities. Their work focuses on the analysis of thousands of brain measurements collected through medical imaging procedures, including SPECT, PET, and MRI.

Carmack and Spence contend that the challenge in analyzing medical imaging data for changes in brain activity occurs with the hundreds of thousands of measurements that must be analyzed from throughout the brain from each person. To obtain accurate comparisons, numerous subjects must undergo medical imaging several different times.

New techniques they are developing will help medical researchers focus on impaired regions of the deep brain in three ways: improving methods for locating specific structures within the deep brain that are very small and difficult to find; enhancing the detection of brain functioning changes through transformation methods that increase the measured signals when changes in brain activation occur; and developing more powerful statistical procedures that use information from neighboring locations to enhance the measured signal of a brain structure.

These new methods hold great potential to dramatically improve the ability of medical researchers to identify changes in deep brain activity, says Professor of Statistical Science Richard Gunst. One application of this work is in the continuing investigation of the Gulf War Syndrome, which is believed to be caused by damage to deep brain structures.

This work is a collaborative effort among members of SMU’s Department of Statistical Science led by SMU alumnus Dr. Robert Haley at the University of Texas Southwestern Medical Center at Dallas. The research has been supported by UT Southwestern contracts to SMU Statistical Science Professors William R. Schucany, Wayne A. Woodward, and Gunst.

**SCHOOL OF ENGINEERING**

Payam Khashaee, Ph.D. candidate in mechanical engineering, has developed a new damage index for designing structures that are earthquake-resistant. Khashaee contends that significant damage occurring in recent earthquakes ($44 billion at Northridge, California, in 1994 and $150 billion at Kobe, Japan, in 1995) indicates that current seismic design procedures, while meeting life safety requirements, do not limit damage in structures. Building codes intend to limit structural damage by specifying earthquake strength capacity. However, there is no unique procedure for evaluating the damage potential for structures, he says. Quantifying damage is difficult because of uncertainties in estimating earthquake motion and inelastic response of structures. His study examines the relationship between damage, earthquake energy, ductility, and stiffness degradation and proposes a new damage index based on the inelastic deformation of structures. This index enables engineers to design new buildings for an acceptable damage and assess the damage potential of existing buildings.

Khashaee received the 2003 Young Engineer of the Year award from the Texas Society of Professional Engineers, the Graduate Student Paper Award from the Earthquake Engineering Research Institute at its 2004 international conference, and an Outstanding Graduate Student Research Award for Research Day 2004 from SMU. A native of Iran, Khashaee came to SMU to study with Professor Bijan Mohraz, now chair of the Department of Environmental and Civil Engineering.

Susan Wilson, Jin Wang, and Joy Chuang, Ph.D. students in electrical engineering, are designing, fabricating and testing a high-power semiconductor laser with a goal of achieving 10 watts of optical power in a coherent, well-controlled beam emitting light at a single wavelength of 975 nanometers. Existing semiconductor lasers producing such power have an unstable beam that emits a broad spectrum from the edge of the laser. To stabilize the beam, they incorporated a narrow layer in the laser structure with a variable thickness that performs the function of a lens. They also included a grating with a period of about 300 nanometers above the lens layer, which provides frequency selective feedback that selects a single wavelength of operation. At the same time, the grating is a series of antennas that radiate the coherent light from the surface of the laser, instead of the edge. As a result, higher powers can be achieved with better reliability. Such devices have applications to laser radar, laser machining, and free space communications.

Funding for this research has been provided by the U.S. Air Force. A small business innovative research grant was awarded to Photodigm Inc., an SMU start-up company, to further develop their laser. TriQuint Semiconductor grows the semiconductor structures designed by SMU and Photodigm. For their work, Wilson, Wang, and Chuang received the 2003 Graduate Student Research Award from SMU. Professor of Electrical Engineering Gary Evans serves as their advisor.
In Statistical Science, two Ph.D. students are developing new methods to analyze deep brain activity that could lead to greater understanding of Gulf War Syndrome. In Mechanical Engineering, a Ph.D. candidate has devised a new damage index that could help make buildings more earthquake-resistant. About 330 Ph.D. students in Dedman College of Humanities and Sciences and in the School of Engineering conduct research that has potential to resolve critical issues or create solutions for society's needs. Each year SMU Research and Graduate Studies sponsors a Research Day for graduate and Ph.D. students in these schools. Following are brief profiles on some recent Research Day winners and their research.

DEDMAN COLLEGE

Dora Lesley Burdette, earned her M.S. degree in biological sciences from SMU in May 2003 and enrolled in the Ph.D. program at UT Southwestern Medical Center in the fall. She conducted her research on the organism Trypanosoma brucei, a single-cell parasite that inhabits blood, lymph, and cerebrospinal fluid of the infected host. Trypanosomes, which can evade the immune system, cause lethal infections in humans and livestock. Because they have made a major public health impact on sub-Saharan Africa, the World Health Organization ranks the parasite among the most important infections in the world.

In an effort to identify targets for new therapies, Burdette, under the direction of Biological Sciences Professor Larry Ruben, studied biochemical pathways that are required for survival, emphasizing signal processes that coordinate many of the pathways. She investigated the role of a signal protein called TRACK in cell survival. The data obtained demonstrated that TRACK and its associated proteins were viable therapy targets, Ruben says. "Because the cells could not propagate when TRACK was missing, the studies hold promise that the disruption of TRACK with pharmacological agents could help cure the infection."

Burdette's project, which won a 2003 Research Day award from SMU, was supported in part by a $1 million grant from the National Institutes of Health Division on Allergy and Infectious Disease.

Patrick Carmack and Jeff Spence, Ph.D. students in statistical science, are developing new statistical approaches to...
The paintings of Barnaby Fitzgerald tell stories that can be considered mysteries or metaphors or allegories, but they all have something interesting to say. A recent painting, "Enronius," depicts an obese, nude, Bacchus-like figure lounging on the back of a leopard as he drains his enormous glass of wine into the animal's open mouth. Enronius drapes his arm around a frail, blood-red woman, while a lovely female nude holding a whip floats in the air. Although the story is open to interpretation, the allusion to collapsed corporate giant Enron as a gluttonous Bacchus, the Greek god of wine, is perfectly clear. The SMU professor of art, who was reared in and studied printmaking in Italy, draws on his classical and cosmopolitan background to create paintings that are figurative and representational, but hardly traditional. Fitzgerald, who joined SMU in 1984, received his M.F.A. in art from Yale University. His works, represented by Valley House Gallery in Dallas, can be seen at www.valleyhouse.com.

Opposite: Artist Barnaby Fitzgerald in front of St. Christopher, 2003, 70x60 inches, oil on canvas
PORTRAIT OF AN artist
William Abraham, Theology; Annemarie Weyl Curt, Art History; Rita Whillock, Corporate Communications and Public Affairs; and Wayne Woodward, Statistical Science, were named University Distinguished Teaching Professors for 2003 and joined SMU's Academy of Distinguished Teachers.

John Buynak, Chemistry; Scott Douglas, Electrical Engineering; Rebekah Miles, Theology; and Kamal Saggi, Economics, were named 2003 Ford Research Fellows, a distinction that recognizes faculty for their research efforts with a $15,000 stipend.

Mark Chancey, Religious Studies; Karl Kilinski, Art History; and Rajani Sudan, English, received the 2003 Dedman College Godbey Lecture Series Authors' Awards for outstanding scholarly research. Chancey received the award for his book, The Myth of a Gentile Galilee; Kilinski was honored for The Flight of Icarus Through Western Art; and Sudan was recognized for Fair Exotics, Xenophobic Subjects in English Literature, 1720-1850.

Mark Chancey, Religious Studies, was named Regional Scholar by the National Society of Biblical Literature.

Jamie Clark-Soles, Theology, was nominated as a Regional Scholar by the Southwest Region of the Society of Biblical Literature in March 2003.

Charles Curran, Scurlock Chair in Human Values, received the Presidential Award for Lifetime Scholarly Achievement from the College Theology Society; honored with a festschrift, A Call to Fidelity: On the Moral Theology of Charles E. Curran (Georgetown University Press, 2002), and with a symposium and reception at the annual meeting of the Catholic Theological Society of America in June 2003; delivered several notable lectures, including the Margaret Lindquist Lecture at Yale University Divinity School in October 2003, among others.

Mel Fugate, Management and Organization, had two papers recognized by the Academy of Management: “Employability: The construct, its dimensions, and applications” for Best Paper Proceedings of the 2003 annual meeting, and “Coping with an organizational merger over four stages,” Personnel Psychology, 55: 905-928, runner-up for the Scholarly Achievement Award at the meeting.

Ezra Greenspan, English, received an award from the Association of American Publishers/Professional and Scholarly Publishing Division for his biography George Palmer Putnam: Representative American Publisher; elected to membership in the American Antiquarian Society in 2003.

John Lowe, Law, was elected in July 2003 the 50th president of the Rocky Mountain Mineral Law Foundation, dedicated to the study of the legal system and issues affecting mineral, water, and public lands resources.

Bijan Mohraz, Environmental and Civil Engineering, was named 2004 president of the Architectural Engineering Institute of the American Society of Civil Engineers.

Jack Myers, English, was appointed Texas Poet Laureate for 2003 by the Texas Commission on the Arts.

Carolyn Sargent, Anthropology, received an award for the book Childbirth and Authoritative Knowledge, which she co-edited with Robbie Davis Floyd, from the Council on Reproduction, a unit of the Society for Medical Anthropology, for the most enduring contribution of significance to the field.

Marshall Terry, English, was named a Fellow of the Texas Institute of Letters.

Trysh Travis, English, was awarded the Reese Fellowship, Bibliographical Society of America, 2003; John Nicholas Brown Fellowship in American Civilization, 2003; and Sam Taylor Fellowship for Faculty at Methodist Colleges in Texas, 2003, all related to her book-in-progress, The Persistence of Sentiment.


David Weber, History, was knighted and inducted into the Orden de Isabel la Católica by the King of Spain, Juan Carlos, in May 2003. He was invited to give several distinguished lectures, including a Plenary Address at the 43rd annual meeting of the German American Studies Association, Wittenberg, Germany; the Lyon G. Tyler Lecture, College of William and Mary; and the Carl Becker Lectures at Cornell University.
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