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On the cover: Computer-generated image of 64 different bubbles that fit together to form a soap froth. The images were created using the Surface Evolver, a computer program developed by Ken Brakke at the Geometry Center, University of Minnesota. See article on page 8.
A $12 million pledge from SMU Trustee Robert Dedman and his wife, Nancy, will make the life sciences building a reality soon, and construction work has begun to link Fondren Library with the Science and Engineering Library. The campus will be altered for the better by the time the 21st century arrives.

Industry and business expect SMU to educate students to become citizens and professionals who will contribute to the future as leaders and decision makers. The Campaign for SMU promises to help the University to continue to meet this expectation.

SMU Research strives to present to our readership examples of research conducted during the previous academic year and the funding that sponsored it. This issue highlights exciting new developments in applied mathematics, extols the scholarship of one of SMU’s eminent art historians, as well as explores the role of research in the life of the academy. It also features the work of some of our graduate students, the potential researchers of tomorrow.

This is our way of sharing with you SMU’s enthusiasm for a vigorous academic life energized by research. We invite and encourage you to give us your responses to information presented in this magazine. Your continued support is greatly appreciated.

U. Narayan Bhat
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Anyone who has encountered a technology change—whether through a new personal computer or a systemwide conversion in the workplace—has experienced the time-consuming problems that accompany the implementation of a new computer system.

"For most companies, change is expensive, time-consuming, and traumatic," says Cynthia Beath, associate professor of management information sciences in the Edwin L. Cox School of Business. As a former computer analyst, programmer, and manager, Beath has experienced many of the frustrations that she studies. In these positions, she first began to question why adapting to technological changes in the workplace is so difficult and how the process could be improved.

The key to correcting the problem, Beath believes, is creating a working partnership between the technology specialist, or service provider, and the user. In her current research, Beath investigates how charge-back systems can foster a partnership between the two parties. A charge-back system is the method by which an organization bills itself internally, or one department bills another for its services. The effectiveness of this system in building relationships depends on how an organization designs and uses it. For example, charge-back systems are more effective if charges are negotiated before the service occurs, she says.

"If the departments negotiate rates, explain the bill, and help users understand what drives costs, then they can jointly focus on reducing those costs. The benefits are an improved working relationship, better investment in technology, a more standardized infrastructure, and a partnership that can make future technology decisions," she says.

In other research, Beath is determining how firms can contract for systems development or systems integration in situations where new learning or new discoveries are the key to completing projects successfully. When a firm needs new software, information technologists often need to learn more about the organization’s business practices, or even about what a particular new technology can do. In a joint project funded by a National Science Foundation grant, Beath and Gordon Walker, professor of business policy, are trying to understand how to contract for this kind of learning.

"We know a lot about how to contract for existing skills or knowledge," she says. "Firms want to bring in outside specialists for their technology skills. But how can you know that they will learn enough about the company's business to implement the right system?"

Beath, who joined the SMU faculty in 1992, received her Ph.D. from UCLA. Her latest articles include "The Enactment and Consequences of Token, Shared and Compliant Participation in Information Systems Development" in Accounting Management and Information Technologies, 1996.
The Data Is In The Genes

Jeffery Kennington, professor of computer science and engineering in the School of Engineering and Applied Science, has developed a software model that helps telecommunications engineers design reliable, cost-efficient long-distance networks. Kennington's co-principal researcher on the model is Sukumaran Nair, associate professor of computer science and engineering.

Using a theory of mathematics known as optimization, the model tells engineers how to build in the minimum amount of spare capacity in their networks. Networks have both working capacity, those assigned lines that work all the time, and spare capacity, lines that sit idle unless the system fails somewhere.

"Spare capacity is like an empty road that nobody can drive on unless the main interstate suddenly experiences a shutdown and traffic must be rerouted to that road," Kennington says. A well-designed network does not waste spare capacity because it requires the installation of additional electronic hardware, which is expensive to maintain and quick to become obsolete.

A reliable network also is important, Kennington says, especially if long-distance corporate customers have busy 800 numbers to maintain. In the fierce competition for these customers, long-distance carriers such as MCI and AT&T market the reliability of their networks to ensure continuous service.

Kennington's model has found a good balance between costs and reliability. And it's the fastest of its kind. In about four minutes, the model can calculate the minimum spare capacity for a large long-distance network in the United States. Previous mathematical models by Kennington have been installed on MCI's system for real-time restoration.

Kennington is the author of Algorithms for Network Programming and has written more than 40 articles on network design that have appeared in such journals as Operations Research, Management Science, Naval Research Logistics Quarterly, and ORSA Journal on Computing. He received his M.S. and Ph.D. degrees in industrial engineering from the Georgia Institute of Technology. He has been named the outstanding undergraduate teacher of the year twice for the Department of Computer Science and Engineering.
UNDERSTANDING
THE DAY-TO-DAY BUSINESS
OF GLOBAL CORPORATIONS

Michel Vetsuypens sometimes imagines himself in the chair of a chief financial officer to understand the financial information needs of a modern global corporation.

The exercise enables the Cox School of Business professor of finance to apply his research that focuses on financial management to a corporation's daily operations. His research includes understanding the effects of an underwriter’s reputation on initial public stock offerings, the pros and cons of corporate vs. independent venture capital, or even how certain stock sales can reflect market sentiments.

In his current research, Vetsuypens is examining the role of investment banks that underwrite the sale of securities and the value of a firm's reputation. To determine how reputation is built or lost, Vetsuypens studies data indicating how well underwriters price initial stock offerings. Pricing errors — in which the set price deviates from the ultimate market price — largely affect a firm’s reputation, he says. "Presumably, a reputation is gained because a firm is doing something right. What separates a high-reputation banker from one with a lower reputation? The former can estimate the demand for securities and can set a more realistic price."

Vetsuypens also is conducting research on corporate venture capital firms. Traditionally, start-up companies have used independent venture capital firms for seed money. Now corporations are creating venture capital divisions of their own. Vetsuypens wants to know if these new corporate arms compare with traditional sources of capital and what advantages they offer. For example, he says, a biotech corporation may be a good source of funding for a biotech venture.

In other research, Vetsuypens is determining how short-interest stock sales, a concept called "shorting," reflect market sentiments. Shorting is the practice of borrowing stock and selling it at a high price. For the borrower to make money, the stock price must fall by the time the stock must be repurchased and the stock loan repaid. Short sales are a barometer of negative sentiment about a company and its stock, Vetsuypens says. He is investigating whether good news about a company, such as profitable quarterly earnings, will diminish the number of short sales of a company’s stock.

Vetsuypens, who joined SMU in 1985, earned his M.S. and Ph.D. degrees from the Simon Graduate School of Business Administration at the University of Rochester. He has published numerous articles in publications such as the Journal of Finance and the Journal of Financial Economics.

Shedding Light on Early Modern Science and Culture

Every Monday afternoon from 1630 to 1642, a group of French intellectuals gathered in Paris at the Bureau d'adresse to discuss such topics as "Whether Man or Woman Be the More Noble," "Of Jurisdiction Astrology," or "What is Less Blamable – Avarice or Prodigality?" Such topics were commonplace to Renaissance rhetoric. What was unusual about the discussions at the Bureau, according to historian Kathleen Wellman, are the scientific approaches that participants applied to the rhetorical traditions of the Renaissance era to analyze social values and institutions. Wellman, associate professor of history who joined Dedman College in 1989, is writing a book focusing on a collection of the 348 academic conferences held at the Bureau d'adresse under the auspices of Theophraste Renaudot, an influential bureaucrat under Louis XIII. "I intend to use the published proceedings – the Discourses of the Virtuosi of France – to illuminate the character of 17th-century paradigms and to illustrate the growing influence of science on French culture," she says. Wellman received a 1996-97 National Endowment for the Humanities Fellowship for College Teachers to complete the book. In addition, Wellman also is conducting research on how philosophers of the 18th century viewed human physiology, particularly as it applied to social, moral, and political issues. "I'm exploring the work of 17th-century physiologists and their response to the unsolved philosophical problems. Then I will look at the response to these new ways of understanding the body by the philosophers, Condillac, La Mettrie, Diderot, and Cabanis," she says. Wellman, who earned her M.A. and Ph.D. degrees from the University of Chicago, began her research on the scientific and medical communities of the 18th century with her dissertation, "Julien Offray de La Mettrie: Medicine in the Service of Philosophy." She expanded that into a book, La Mettrie: Medicine, Philosophy, and Enlightenment, published in 1992. Her most recent article, "Nature and Culture in the Discourses of the Virtuosi of France," appeared in Experiencing Nature, published in 1997 by Kluwer Press. The Netherlands. In addition, articles on the Bureau d'adresse and La Mettrie have been accepted by The Encyclopedia of the Scientific Revolution and Routledge Encyclopedia of Philosophy, respectively.

PHOTOGRAPHER: JOHN GIBSON
Theologian Ruben L.F. Habito is examining a Japanese Buddhist leader's life and teachings and relating them to current issues. "I'm studying him to see what we can learn from people with religious visions," says Habito, professor of world religions and spirituality in Perkins School of Theology.

The Buddhist teacher, Nichiren (1222-1282), questioned the political and social conditions of his time. In the 13th century, Japan was steeped in political and social turmoil. The Mongols were threatening to invade, the Japanese were fighting among themselves, the powerful inflicted great injustices upon the weak, and thousands were dying in the streets. "It was [in this] period that several religious giants appeared, and their lives and teachings became a beacon for so many others," Habito says.

Nichiren was one such leader. Based on his religious convictions, he questioned why there was so much violence in society, which led to a search for answers in the collection of Buddhist teachings called the Lotus Sutra. What he sought, Habito says, was a way to transform a society of injustice and turmoil to one grounded in principles of justice and truth. Nichiren felt it was important that the principles of Dharma – living truth – be practiced throughout society. "Nichiren wanted to change his society to one that emphasized greater equality, less discrimination, one that was more humane," Habito says.

Because Nichiren was a vocal opponent of the injustices he saw, his inquiries and criticism were unpopular with authorities, and he was persecuted for his beliefs. "That convinced him all the more of the authenticity of his religious mission," Habito says.

Habito first considered a contemporary analysis of Nichiren's writings while a graduate student at Tokyo University. He launched the work in 1995 when he received a Henry Luce III Fellows in Theology Grant. His research on the past elicits questions of reverence today, "about how one's religious convictions can lead to action toward greater justice and equality for all peoples," he says.

Habito, who joined SMU in 1989, earned degrees from Tokyo University, Sophia University, and Ateneo de Manila University. His more than a dozen books include Originary Enlightenment: Tendai Hongaku Doctrine and Japanese Buddhism, Mission and Ministry in Global Perspective: Religious Pluralism and Challenges to the Church, and Healing Breath: Zen Spirituality for a Wounded Earth.
A journalist, Darwin Payne has kept his finger on the pulse of history — as an eyewitness and its recorder. Through numerous books, the professor of journalism in the Center for Communication Arts has chronicled the 20th century in Dallas, particularly the Kennedy assassination.

Payne's latest research on the subject, compiled with former SMU Assistant Professor Laura Hlavach, appears in Reporting the Kennedy Assassination: Journalists Who Were There Recall Their Experiences (Three Forks Press, 1996). Interviews with those who covered the events as they unfolded reinforced what Payne, then a reporter at the Dallas Times Herald, always has felt about the assassination: "Many people believe in a conspiracy theory. Most people who were involved in covering it or working it believe there was no conspiracy." His long interest in the press angle on the Kennedy assassination began in 1970, when he published a monograph, The Press Corps and the Kennedy Assassination, for the Association for Education in Journalism.

"As a journalist, I've always been interested in the origin of a story," Payne says. "Journalism is like writing the first rough draft of history. Through books, I get to do a more thorough job of exploring the background of a story."

Although Texas is a perennial favorite topic among Texans, Payne has discovered a ready audience for Dallas history among the city's citizens. He has written Big D: Triumphs and Troubles of an American Supercity in the 20th Century (1994), and Dallas: An Illustrated History (1982), and edited Sketches of a Growing Town: Episodes and People of Dallas from Early Times to Recent Days, written by his students in a Master's of Liberal Arts course in 1991.

A book published by SMU Press in 1985, Owen Wister: Chronicler of the West, Gentleman of the East, won Payne several awards, including the Texas Institute of Letters Award. Wister was the author of one of the definitive Western novels, The Virginian.

Payne is working on two new projects about Dallas — Reaching a Dream: How Dallas and Fort Worth Came Together and Built the World's Busiest Airport, with Associate Professor of Communications Kathy Fitzpatrick, and Lawyers and Dallas: A History of the Dallas Bar Association and the Legal Profession. For the latter book, the Dallas Bar Foundation gave him a grant to write a history about the legal profession in Dallas.

Payne, who joined SMU in 1971, earned a Bachelor's of Journalism degree and a Ph.D. in American civilization from the University of Texas-Austin and a Master's degree in history from SMU.
SETTING GOALS, ACHIEVING A DREAM

Associate Professor of Psychology Laura King examines goals – day-to-day, short-term, and lifelong.

King's work considers what personal goals say about an individual. For example, people who accomplish daily "to-do" lists feel better about themselves, she says. "If you have short-term, doable goals, you tend to feel happier on a day-to-day basis because you're achieving what you want."

King's current research studies individuals who have invested in long-term goals that require a great deal of effort or luck to achieve and often may not be obtainable, such as those who want to become doctors, lawyers, movie stars, or professional athletes. "We are looking at people with life goals and how those goals affect their daily lives and physical and psychological health," she says.

Funded by a five-year grant from the National Institute for Mental Health, King began her research, which she believes will be useful in academic advising, three years ago. It follows SMU students – 120 premed and 100 theatre/dance – through their college careers until a year after graduation. The research focuses on how these students adapt to unanticipated circumstances. "We are looking at how they respond to changes in their lives, how they reinvent their futures," she says.

For example, she asks, what happens if a student develops an aversion to a task? "We have students who are very motivated, but who just don't have the stomach for their premed studies." Or what happens when a student realizes the dream is unobtainable? she asks. "We want to know if they can apply what they've learned to something else, or do they become bitter and unable to invest in another set of goals."

King also is examining how daily goals relate to life dreams, which describe what a person's life will be like. She was surprised at what she discovered. "Most students never mention their occupations, but rather they mention the things they are going to have – houses, cars, status, ideal mate."

In addition, King is studying several other groups of individuals who have gone through traumatic experiences that challenged their identities. Women who were married 20 years or more and divorced, parents of Down's syndrome children, infertile couples, gay men and women, and athletes whose careers were cut short by injury. "These people have demonstrated the human spirit's enormous capacity for surviving and reconstructing itself."

King, who joined SMU in 1991, earned her Ph.D. from the University of California-Davis. She has several articles in press, including "What makes a life good?" for the Journal of Personality and Social Psychology.
AN ABSTRACT ART

RESEARCHERS CONVERSE IN THE LANGUAGE OF NUMBERS

BY DEBORAH WORMSER

In Carl Sagan's "Contact," the alien-human discourse begins in mathematics, "the universal language." Although still Greek to many on Earth, three mathematicians in SMU's Dedman College of Humanities and Sciences are using that language in research that could affect the way we view our universe and communicate with each other.

Their work, however, is somewhat abstract. In fact, they seldom handle the devices they work on, only the models.

Thomas Carr, assistant professor of mathematics, is studying the dynamics of lasers and Josephson-junctions - tiny superconductors that can be used in circuits. "I investigate mathematical models that describe lasers, Josephson-junctions, or whichever problem I'm interested in."

Carr describes his area of interest as coupled oscillators, systems of interconnected devices that oscillate - or change - in time or space to learn how the behavior of one part of the system affects the behavior of the other parts. The models he uses include differential equations and iterative maps, which show how a laser would work over time in real use.

Carr investigates models of lasers that are partial and ordinary differential equations. "We could be modeling the operation of the laser as a function of time and/or space. If you look along the length or cross section of the beam, that's the spatial dimension. While a laser beam looks small to us, a cross section of a laser beam has a width to it, just as a flashlight beam has a width. Some interesting spatial-temporal dynamics can occur in that cross section. For instance, the intensity, or brightness, can vary from bright to dark, forming complex patterns such as grids of hexagons," he says.

This research can be applied in the field of free-space communication, in which light pulses send signals through the atmosphere from one building to another or even from one satellite to another in space. Other applications are in fiber-optic communications, in which a light beam is sent down an optical fiber. The beams are often sent from laser diodes or semiconductor lasers, Carr says. Semiconductor lasers are small and easily fabricated, much like computer chips.

"The difficulty is that semiconductor lasers can't put out much power, so we would like to couple many of these devices together so that they begin to act as one laser," he says. "The problem is, in a very crude sense, that they don't like to cooperate. In technical terms, I want all these different lasers to behave coherently and, in that way, increase the power. If they behave incoherently, not as much power will be emitted by the array of lasers."

In his second year at SMU, Carr receives funding from the Naval Research Laboratory, where he conducted postdoctoral work after completing his doctorate at Northwestern University.
BRINGING THE UNIVERSE INTO FOCUS

Blanks of mathematical calculations are needed to remove the blurring caused by the atmosphere when Earth-based telescopes try to photograph the billions of stars and other objects in space. Image reconstruction — recovering meaningful information hidden in fuzzy images — is the focus of Associate Professor Jim Nagy’s research. Images from space-based cameras also show some blur. For instance, although the manufacturing defects in the original mirrors of the Hubble Space Telescope were fixed in 1994, some distortions can occur from other effects, such as spacecraft jitter, Nagy says.

Nagy worked with researchers at the University of Maryland at College Park to remove the distortion from some of the Hubble’s early faulty images in a project sponsored by the National Science Foundation. “Before the mirror was fixed the images were quite poor, but with this postprocessing of the images they actually turned out to be quite good,” he says.

Although basic linear algebra techniques can be used to improve the quality of these images, the mathematical problem is quite difficult, Nagy says. “Some sophisticated mathematics are required to set up a good method for solving the problem, and the computations are quite intense so takes fairly powerful parallel computers to do these computations quickly.”

Nagy uses 16 high-end workstations connected to a high-speed communication device. He achieves speed by assigning each computer only part of the computation and letting the central workstation synthesize the data.

He is trying to model the blur and create efficient algorithms to reduce image distortion. Applications of his research include sharpening images from cameras sensitive enough to photograph a satellite from Earth. Such cameras could be used to determine if a satellite’s solar panels and antennae are deployed correctly or to report on what an enemy satellite is doing.

Nagy would like to adapt this work to medical imaging problems, such as clearing up images from X-ray computerized tomography (CT) scans. “Essentially you try to minimize the dose of radiation that you give the patient and try to get an image out of it as you can,” he says.

During his six years at SMU, Nagy has taught everything from first semester calculus through graduate courses, and sometimes uses examples from his work to demonstrate applications for the concepts he teaches. “I can be more enthusiastic about what I’m doing,” he says. “Our department emphasizes a balance between research and teaching. You want to provide your students with a good education, and part of that is being on top of what’s going on in your field.”

SMU’s Mathematics Department, which offers Bachelor’s, Master’s, and Ph.D. degrees, is unique, says chair and Professor of Mathematics Warren Ferguson, who has consulted for Cyrix, Texas Instruments, and Mobil Oil Corporation. “Most math departments conduct research in several areas, such as analysis, algebra, number theory, statistics, or applied mathematics. Our department is different because the research is concentrated largely in applied mathematics,” he says.

By focusing on applied mathematics, students, particularly at the graduate level, can tackle real-world problems and become more employable, Ferguson says. Departmental enrollment is near an all-time high and, in a field where unemployment runs 20 percent for Ph.D.s, almost all the graduates in the past five years have received job offers before graduation. Many undergraduates, who often carry a double major in math and engineering, are hired by consulting firms, telecommunications companies, or the financial services industry.

Crossing disciplines has been central not only to SMU’s math students’ success in finding jobs, but also to Doug Reinhelt’s 10-year research partnership with Andrew Kraynik, a chemical engineer at Sandia National Laboratories in New Mexico. Reinhelt, professor of mathematics, specializes in foam rheology — the study of the deformation and flow of matter.

“This relationship works so well because he brings different things to the table than I do,” Reinhelt says. “With his engineering background and my mathematics background we’re able to do things with foams that people with only one or the other background could not do.”

In a wet foam, liquid walls separate spherical bubbles. As the liquid drains out of a wet foam, the bubbles press against each other, forming a dry foam in which the bubbles have become polyhedrons. Typically foams are about 95 percent air and 5 percent liquid. The liquid is generally 99 percent water and 1 percent surfactant. The surfactant keeps surface tension from collapsing bubbles by stabilizing the thin liquid films separating the bubbles. Surface tension tries to keep the surface area as small as possible; that’s why soap bubbles and raindrops are round, Reinhelt says.

Reinhelt develops mathematical models for foams so engineers can better understand their characteristics. The engineers then could create foams for new uses. Foams have numerous applications in foods, cosmetics, and pharmaceuticals. Common foams include shaving cream and whipped dessert topping. Liquid foams are used in petroleum drilling and secondary oil recovery as well as geothermal energy production.

Foam also is used in cellular solids, such as reinforcements inside car doors that make automobiles safer without reducing fuel efficiency because the foams are strong but lightweight.

“I’m focusing on the liquid aspects of foam, but even cellular solids first undergo a liquid stage, and understanding the liquid stage can have a big effect on what kind of material you get in the end,” he says.

THINGS COULD GET STICKY

Do foams have a future in law enforcement? Some agencies are toying with the idea.

“If terrorists attack nuclear power plants, you don’t want to go in with guns or weapons in that situation, but a foam could do the job,” Reinhelt says. For example, the suspect could be sprayed with a foam that becomes tacky-like on contact.

Because they contain so little liquid, foams could be used to protect... 

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CREATING

A New...

Art historian combines life and art

Alessandra Comini

What I know�
Alessandra Comini’s research has given rise to a new discipline—musical iconography, the study of pictures and images related to music. Comini, University of Illinois Distinguished Professor of Art History and Meadows School of the Arts, has combined her two loves—art and music—into a multidisciplinary approach to history unlike any other. She is a pioneer into the past, searching out new ideas and concepts, and ultimately, the truth.

Comini’s research focuses on idols, images, and environments that surround historic artists and musicians. She theorizes that by looking beyond the art itself to the images that created the environment it arose from, one can gain a multitude of knowledge on many levels.

“Comini’s research is focused on the life and times of composers and their works. Through her research, she is able to uncover the truth about the lives of these composers, their influences, and the impact they had on music.”

To illustrate her research, Comini uses the example of Beethoven, a composer who had a significant influence on the development of music. She examines the images of Beethoven in art, literature, and music, and how these images have evolved over time. She also looks at the role of women in music, and how their contributions have been overlooked in the past.

Discipline

Idols and images to understand the facts of lives

composers’s life, what will they tell us? What I’ve discovered—the slides and pictures of the travels, the knowledge—is there any other essential research of these things in this context.”

Comini’s passion has led her to her latest endeavors, which include expansive studies of Scandinavian art and music. During the past seven years, she has traveled throughout Scandinavia, allowing her to take on lives of their own. “Own things evolve. I generally don’t know where my work is headed; I only know I better photograph and collect, and allow the truth to surface,” she says.

An example of her modus operandi is an adventure that led Comini to Finland four years ago. After presenting a lecture at the Institute of Fine Arts in New York City, Comini was approached by a man who introduced herself as the great-grandson of Axel Gallen-Kallela. “He was surprised that knew of his great-grandfather, who was Finland’s greatest male painter at the turn of the century,” she says.

Comini eventually was invited to visit the family; she stayed for a month. During her visit, she encountered an overlooked moment in history—three hours to be exact. In 1907 Gustav Mahler came to Helsinki for five days. His visit, performance, and time spent with Sibelius are well-documented. What is not commonly known is that on the Saturday morning of his stay, he was whisked away in a motor boat by Gallen-Kallela for a three-hour tour of Helsinki’s skerries and an excursion to a log-and-stone home on the shore of Lake Vitrask.

On record, Comini says, are only two letters that Mahler had written to his wife, Alma, about his visit to Helsinki. Comini decided to dig around and explore the artistic circle that Mahler touched in Finland in hopes of discovering some untold treasures from his trip. She struck Scandinavian gold.

“The Gallen-Kallela family provided me with a photograph of the actual motor boat,” she says. “I also found the actual hotel where Mahler stayed. No one else brought to light are Alma Mahler, who was a composer herself before her marriage to Gustav Mahler, and German artist Kathe Kollwitz (1867-1945). In an article, “Kollwitz in Context: The Formative Years,” published in 1992 by Yale University Press for a retrospective of Kollwitz work at the National Gallery of Art, Comini examines the context of Kollwitz life. Kollwitz used “art as a hammer with which to shape reality,” she says.

Comini has published the results of her work in numerous reviews, essays, and articles for national and international publications. She has also published seven books, many of which have garnered awards and critical acclaim, including her pinnacle work in musical iconography, The Changing Image of Beethoven: A Study in Mythmaking (Rizzoli, 1987). By utilizing paintings, sculptures, prints, and verbal accounts, Comini examines the contradictory images of Beethoven during his life and beyond.

“The myths about Beethoven were the largest,” Comini says, “because he was the great one. In addition to exterior images of Beethoven, such as various forms of art, there were also interior images of Beethoven, held by composers who followed him. And those images strongly affected them, their music, their conducting, and so forth.”

Before Beethoven, however, there was Brahms, Comini’s first composer of contextual study. When she joined SMU in 1974, Comini came upon a most unusual find: a portfolio of pictures taken of Brahms’ apartment in Vienna shortly after his death. “An enterprising friend of Brahms photographed every wall of the place where Brahms lived for the last 25 years of his life,” she says. “And those photographs had lain fallow for years.”

With a magnifying glass, Comini examined the photos, and her finds were one of a kind. For example, Brahms still displayed his childhood toy soldiers. The color schemes of his apartment were representative of the chromaticism of his music. On his walls were prints by contemporary artist and friend Max Klinger. Most interesting were two effigies found in the apartment that attest to the greatest influences in Brahms’ life—Bismarck and Bach — the

Continued on page 20
The first comprehensive biography of Stephen F. Austin to be written in 70 years requires a daunting effort to research the activities of one of the most enduring Texas heroes. The historian who can give the “Father of Texas” his due after sifting through documents dating from the late 1700s to the mid-1800s may impact teaching and scholarship with new information about a critical and colorful period in American history.

Gregg Cantrell, the first Summerlee Research Fellow of SMU’s William P. Clements Center for Southwest Studies, had invested more than five years in research and writing Austin’s biography before the center offered him an opportunity to shift what seemed to be a never-ending project into fast-forward.

The fellowship, which allowed Cantrell to take a year off from his teaching position at Sam Houston State University, brought him into the fold of Southwest scholars at SMU. In addition, it made available the DeGolyer Library’s resources and enabled him to assemble a round-table session with nationally prominent historians who would guide him in refining the book’s focus. Cantrell’s year of residence at SMU was expected to provide new perspectives on Texas history and inspire discussions about its people and politics.

Cantrell’s fellowship more than met...
 expectations, says David Weber, director of the southwest Studies Center. Yale University press has accepted the Austin biography for publication next year.

"Bringing scholars like Gregg Cantrell to SMU is great for the faculty and the students, cause interacting with others who have new ideas and research questions keeps faculty from becoming stagnant," says Weber, the Robert H. and Nancy Dulan<br>

Professor of History. "Young scholars tend to be on the cutting edge of a discipline while older scholars bring a depth of experience and knowledge."

The Clements Center is among an array of research centers at SMU — each with a different focus, design, and mission — that attract faculty and students because of their special interests while uniting the community through the common goal of higher learning in a liberal arts environment.

"Center plays a major role at any university in which research is one of the agendas," says U. N. Sarayen Bhat, dean of research and graduate studies. "SMU is strengthening its research through the use of centers."

In addition to fostering intellectual synergy, centers also can serve a strategic purpose related to research, Bhat says. Centers, for groups of researchers, often can obtain more funding and tackle more ambitious projects than a single scholar. And some fund sources prefer to support group and interdisciplinary research. The existence of a center also indicates to funding sources other academic institutions, and the panic that SMU has faculty who are working on a particular topic, Bhat says.

The Cary M. Maguire Center for Ethics and Public Responsibility, for example, brought together in 1995 a group of faculty members from various departments who are doing research and teaching related to ethics. Under the leadership of nationally respected ethicist William F. May, the center encourages faculty members to work together on ethical issues, to develop more courses related to ethics, and to include or increase an emphasis on ethics in other courses.

The center also sponsors public programs focusing on specific ethical problems that impact numerous people. Issues have included ethics related to managed care, fundations and trustees, voluntary communities, the media, and contracts and other promises.

"We will publish occasional papers, books, and Web site materials based on the conferences so that the University can share these discussions with a wider audience," says May, director of the Maguire Center and the Cary M. Maguire Professor of Ethics. "We also encourage faculty publishing through the Maguire Scholars Program."

The Clements Center also has brought together a diverse group of scholars from across the campus who have been working for years on research with a Southern component. "The center has helped bring resources together to create a whole that is greater than the sum of the parts," Weber says.

While the Clements Center has focused its attention on a specific region of North America, the John Goodwin Tower Center for Political Studies has opened its doors to the world. The Tower Center encourages faculty members in all disciplines to research topics that include an international component and then incorporate that knowledge into their teaching. It brings to campus experts from around the world to talk about international relations, America's place in the world, and domestic politics and institutions. It also provides two-year grants to selected undergraduate students to research a subject of their choosing and sponsors conferences on timely political topics such as worldwide democratization.

"We want to offer unique research opportunities to motivated undergraduates and help faculty members deepen their expertise so they can share it with students in the classroom," says Calvin Jillson, director of the Tower Center and chair of the Political Science Department. This year Stanford University Press will publish a book edited by Jillson and Political Science Professor James Hollifield on the proceedings of the first Marian Tower International Conference held in April 1997.

Although the Clements, Maguire, and Tower centers are designed to bring together large numbers of faculty from throughout the campus, other SMU centers are focused more on research that involves only one or two departments.

The Center for Marketing Management Studies provides funding for faculty research in the Marketing Department of the Edwin L. Cox School of Business and occasionally conducts research for entities such as trade groups. Faculty from across the Business School conduct research on a variety of subjects, including employee motivation within the advertising, sales, and marketing fields; the effects of competitiveness and interfirm competition on a salaried person's goal-setting and performance; and economic dependency on work as an indicator of the relationship between organizational commitment and performance. "The center helps make the Marketing Department nearly self-sufficient when it comes to supplemental funding for projects," says center director and Professor of Marketing William L. Cron. "Our grant program also has been an effective recruiting tool when we are interviewing prospective faculty members."

The SMU Finance Institute serves a similar function for the Cox School's Finance Department. The institute provides faculty research grants and funds for the department to purchase large financial data sets that are needed for higher levels of research. It also enables faculty members to hire M.B.A. students to help with research projects from which they gain real-world experience before graduation.

The Cox School's Center for Research in Real Estate and Land Use Economics, under the direction of William Bruegeman, the Clara R. and Leo E. Corrigan Senior Professor of Real Estate, and Thomas Thibodeau, professor of real estate, is active in several areas of research. It provides grants to faculty members Universitywide whose research includes a real estate component. The center's research projects include a global study and comparison of the returns on publicly traded real estate securities, a comparison of office building vacancy rates in central business districts and suburban areas in about 50 major metropolitan regions in the United States, and an annual housing price index for Dallas to better understand property markets and factors that contribute to defaults on mortgages.

The Richard B. Johnson Center for Economic Studies comprises a wide range of research from every economics faculty member. Topics include income inequality in the United States, monetary policies that promote growth and reduce unemployment, and productivity in the service sector. In addition, some professors serve as research associates with the Federal continued on page 20
VARIOS FACULTY MEMBERS FROM SMU'S SIX SCHOOLS PUBLISHED THE FOLLOWING SELECTED ARTICLES AND BOOKS IN 1996-97.


THE FOLLOWING SMU FACULTY MEMBERS WERE RECOGNIZED FOR THEIR TEACHING, SCHOLARSHIP, OR RESEARCH DURING 1996-97.

LEWIS BINFORD, Anthropology, has been named a corresponding Fellow of the British Academy.

ZEYNEP ÇELİK-BUTLER, Electrical Engineering, received the 1997 Sixma Xi Research Award from the SMU Chapter.

EDWARD COUNTRYMAN, History; KARL KILINSKI, Art History; and WILLIAM B. TAYLOR, History, received the 1997 Godfrey Lecture Series Authors' Award for their outstanding research, publications, and teaching.

WONMO DONG, Political Science, was elected 1998 president of the Association of Korean Political Studies in North America.

MAURICE ELTON, French, received Le Mot d'Or, a medallion awarded in the category “Writers and Publishers” for his work as editor of French for Business and International Trade from the French association Actions pour Promouvoir le Français des Affaires.

ALICE KENDRICK, Communication Arts, has been elected chair of the American Advertising Federation's Academic Division for 1997-98.

SIMON SARGON, Music, has been named a 1997 recipient of the ASCAP Award by the American Society of Composers, Authors, and Publishers in New York.

RAJ SOHAL, Biological Sciences, received the 1997 Irving Wright Award of Distinction from the American Federation for Aging Research for exceptional contributions to the field.

WILLIAM B. TAYLOR, History, was awarded the 1997 Bryce Wood Book Award of the Latin American Studies Association “for the outstanding book on Latin America in the Social Sciences and Humanities” for Magistrates of the Sacred: Priests and Parishioners in 18th-Century Mexico (Stanford University Press, 1996).

DAVID WEBER, History, and JANE ELDER, Southwest Studies, co-authors of Trading in Santa Fe: John M. Kingsbury’s Correspondence With James Josiah Webb, 1853-1861, received a 1996 Southwest Book Award from the Border Region Library Association for “literary excellence and enrichment of the cultural heritage of the Southwest.”

DAVID MALDONADO, Theology, $217,071, “What Does It Mean To Be a Latino Protestant in the American Context,” Lilly Endowment Inc.


WILLIAM ORR, Biological Sciences, $163,315, “Regulation of Antioxidative Genes and Aging,” National Institutes of Health; and with R.S. SOHAL, Biological Sciences, $40,000, “Relationship Between ALS-associated CuZn Superoxide Dismutase Mutations, Oxidative Stress and Loss of Motor Ability” (year 2), ALS Association.

PAUL PACKMAN, Mechanical Engineering, $26,109 and $10,475, “A Proposal to Offer Short Courses in Fracture Mechanics Design and Fatigue Design at the Texas Institute Learning Center,” Texas Instruments Inc.


LAWRENCE RUBEN, Biological Sciences, $172,739, “Calcium Pathways in African Trypanosomes” (year 8), National Institutes of Health.

TIMOTHY SLATER, Biological Sciences, $135,663, “Molecular Genetics of Insect Steroidogenesis,” Department of Agriculture.


RYSZARD STROYNOWSKI, Physics, $268,000, and with Gary McCARTOR, Physics, $90,000, “Research in Experimental and Theoretical High Energy Physics,” Department of Energy.


A complete list of principal investigators and awards is posted at www.smu.edu/SMU_Research.html
The Doctor of Philosophy degree is offered by the Departments of Anthropology, Biological Sciences, Economics, Geographical Sciences, Mathematics, Physics, Psychology, and Statistical Science in Dedman College; Computer Science and Engineering, Geological Engineering, and Mechanical Engineering in the School of Engineering and Applied Science; and the Graduate Program of Religious Studies. The following research was conducted by 16 graduate students during 1996-97 at SMU.

ARUNA APTE, Computer Science and Engineering, earned a Ph.D. in operations research under the supervision of Associate Professor Richard S. Barr. Apte's dissertation research presented a new class of network-flow models – interval-flow network problems – that enhances the traditional network formulation by broadening their range of applicability and adding greater realism to many existing models. Interval-flow networks build on and expand the sophisticated modeling techniques developed in decades of network optimization research and practice.

JESSIE L. BONNER, Geological Sciences, completed his Ph.D. studies under Eugene Herrn, Shuler-Foscue Professor of Geological Sciences. Bonner's dissertation research investigated the use of geophysical techniques that examine the lithospheric evolution of western North America. He also developed techniques for monitoring a Comprehensive Nuclear Test Ban Treaty. He has contributed articles to several publications.

KENDALL CLARK, Religious Studies, conducts research on recovery and reinterpretation of the traditional Christian doctrine of vocation (“divine calling”) and explores its contribution to contemporary discussion on the relationship between religious commitment and responsible participation in civil society. His dissertation adviser is Charles M. Wood, the Lehman Professor of Christian Doctrine in Perkins School of Theology. Clark is the 1997-98 recipient of the Schubert M. Ogden Fellowship, awarded each year to the graduate student in religious studies whose work “shows the greatest promise of significant contribution” to the field.

KATHRYN DAVISON, Psychology, completed her Ph.D. in May 1997 under the supervision of Professor Jamie Pennebaker. Her research focused on how and when individuals seek out others when they are suffering from various diseases. Davison discovered that the more socially difficult it was to talk about a disease, the more an individual suffered was drawn to a support group. She is developing a community mind-body medical network in the Dallas area, bringing together physicians, psychologists, and alternative healers to develop a comprehensive approach to health care for people afflicted with chronic illnesses.

MOLLY HARTFIELD, Statistical Science, under the direction of Professor Richard F. Gunst, defined a new class of spatial-temporal models for contaminant flow that is based on stochastic differential equations of temporally autoregressive, spatially correlated errors for environmental monitoring projects. This new class of models is not constrained by spatial location of site or by the need for equally spaced complete sampling times, and it includes many of those currently available for discrete time processes. Hartfield completed her doctoral dissertation in fall 1997 and now heads a statistical group working on environmental monitoring projects at Radian International in Austin, Texas.

DOUGLAS HENRY, Anthropology, is a student specializing in medical anthropology under adviser Professor Carolyn Sargent. Henry is conducting his dissertation research in Sierra Leone, Africa, where he has taught biology and health science to secondary school students. His research focuses on changes in indigenous health systems within a refugee camp and asks how indigenous healers reconstruct their practice, how the patterns of risk and vulnerability perceived by refugees change over time, and how the strategic health behavior of refugees responds accordingly. Although conflicts broke out in Sierra Leone soon after his arrival, Henry remains in the area because he believes the project will further understanding of health care among displaced peoples.

AGHA JAHANZEB, Electrical Engineering, is supervised by Associate Professor Donald Butler. Jahanzeb is part of a team working on the development of low-cost, uncooled infrared (IR) detectors, a project that is supported by the National Science Foundation and the Army Research Office. These detectors have strong potential application in the areas of night vision, especially in the civilian sector, as well as other areas of night vision – remote sensing and biomedical and security systems. Jahanzeb has contributed to 12 journal papers and received the outstanding graduate award in electrical engineering in 1993, 1994, and 1995.

JACEK KIERZENKA, Mathematics, is conducting research in the areas of numerical analysis and scientific computation under the supervision of Lawrence F. Shampine, the Betty Clemens Professor of Applied Mathematics. His dissertation investigates the numerical solution of ordinary differential equations (ODEs) and differential-algebraic equations (DAEs) in modern computational environments. Working with Shampine, Kierzenka discovered how to make it possible for users of the popular MATLAB environment to solve a large class of DAEs as easily as solving ODEs. They developed mathematical software based on this theoretical work that will appear in a forthcoming update to MATLAB.

JUN-LIN LIN, Computer Science and Engineering, conducts research on low-cost checkpointing approaches for main memory databases and distributed databases under his dissertation adviser, Associate Professor Margaret Dunham. The goal of checkpointing is to save the database state in non-volatile storage to reduce the amount of work during the restart operation after a failure. Lin's research attempts to design two low-cost checkpointing techniques to reduce the negative impact on system performance caused by the recovery activities and still provide competitive recovery performance.

ROBIN MOCKETT, Biological Sciences, advised by Professor Raj Sohal and Associate Professor William Orr, is working on his dissertation on “Enhancement of Antioxidant Enzyme Expression as a Test of the Oxidative Stress Hypothesis of Aging.” The oxidative stress hypothesis proposes that the destructive changes associated with aging are caused by an
imbaocce among pro-oxidant production, antioxidant defenses, and repair processes, which result in the accumulation of oxidative molecular damage. Mockett's research creates transgenic fruit flies, Drosophila melanogaster, by injecting DNA encoding antioxidant enzymes into fly embryos. The DNA becomes incorporated into the Drosophila genome, and the antioxidants are then expressed at elevated levels in subsequent generations. Flies expressing different antioxidants may be crossed with each other, generating new strains with increased levels of multiple defensive enzymes.

**Maher Sarraj**, Electrical Engineering, is supervised by Milt Gooney, the Cecil and Ida Green Professor of Electrical Engineering. His dissertation investigates the development of high-speed data converters. Sarraj is designing the first single pipeline 10 bit 100 MSPS (mega samples per second) in a CMOS process. Also the converter will have the lowest power dissipation reported to date for such a performance. Expected power dissipation is about 10 times lower than what is available now. These techniques include reducing the output range of the opamps and using the opamp (inside the stage) with a much-improved feedba-ck factor than is currently available. Sarraj also works at Texas Instruments on the development of high-speed data converters (analog to digital and digital to analog).

**James S. Wilson**, Mechanical Engineering, who is advised by Associate Professor Peter E. Raad, is completing a dissertation on "Self-Adaptive Thermal Simulation of Microwave Integrated Circuits." Wilson is on educational leave from Raytheon TI Systems (RTIS), conducting research under a Ph.D. Fellowship from the Systems Group at Texas Instruments. His dissertation topic is an outgrowth of his work for RTIS in the support of monolithic microwave integrated circuit (MMIC) and microwave module thermal modeling. The transient modeling of an integrated circuit (IC), and in particular, an MMIC, is required as part of the design process. The experimental research measures the thermal properties of thin film materials used in high-performance electronic devices and further validates the numerical work with direct, nonintrusive temperature measurements in critical areas of active IC and MMIC devices.

**Donna Yarr**, Religious Studies, is conducting research in religious ethics, specifically on animal experimentation, under adviser Charles E. Curran, the Scarlock Professor of Human Values. Her dissertation reviews recent philosophical, scientific, and theological literature on this subject, with special attention to such issues as the problem of pain, the questions of animal rationality and language, and the concerns about animal rights. Because there is currently no extended treatment of animal experimentation from a Christian theological perspective—despite the interest in the issue by some philosophical ethicists—her work promises to make a significant contribution in a relatively neglected area of her field.

Foraging for Facts

**Pei-Lin Yu**, Anthropology, conducts archaeological research on hunting-and-gathering peoples, particularly the ancient foragers of the American Southwest, under Professor Lewis Binford. Her dissertation will investigate the peoples and environments of the Archaic period (8,500-3,500 years before present). Yu has published a book, Hungry Lightning, about her fieldwork in central Venezuela and her life for nearly two years with the Pume, a hunting-and-gathering group. Yu collected data on the plants and animals that Pume women procure for food, where and how far they traveled to obtain food, and how they made, used, and maintained their tools in camp life and on mobile gathering trips. These records show how a living hunting-and-gathering people organized the material components of their lives, so that archaeologists may hypothesize regarding past hunter-gatherers.
high-security areas full of documents or computers. When a breach in security occurs, an avalanche of dense soap bubbles would be unleashed. The suspects could breathe because of the air in the bubbles, but they would have difficulty seeing or moving around.

A trade-off occurs between the complexity of the model and its usefulness, Reinelt says. “The more complex the model, the more features you take into account and the more complicated it becomes to determine what shape these foams take. On the other hand, if you have a simplistic model, you may be able to solve the problem easily using mathematical techniques but miss some of the important features needed to accurately predict foam behavior.”

Although Reinelt is not directly involved in commercial applications, his models are leading to a better understanding of foams. He and Kraynik have made presentations on their work to Procter and Gamble and Dow Chemical Company. The association with SANDIA started when Lawrence Shampine, the Betty Clements Professor of Applied Mathematics, suggested that Reinelt apply for the national laboratories’ summer faculty-in-residence program.

Two graduate students work with Reinelt. One is conducting foam research, and the other is studying coating flows, the thin liquid films used in printing presses, photographic film, and other applications where even layers are crucial. That work focuses on instabilities, instances when the interface between the air and the ink on a press becomes unstable, creating liquid films with varying thicknesses on the ink cylinder.

Reinelt, who earned his Ph.D. at California Institute of Technology, says he came to SMU 14 years ago because of its interdisciplinary focus. “My graduate adviser at Caltech said my research lies on the border between engineering and mathematics, and a lot of university mathematics departments that focus only on mathematics would think I was on the fringe,” he says. “If I were in the engineering school, they would think I’m too mathematical. But because our department at SMU focuses on using mathematics to solve applied problems, I actually fit in here.”

Iron Chancellor of Germany and the master contrapuntalist of Baroque.

In an article, “The Visual Brahms: Idols and Images,” published in Arts Magazine in 1979, Comini explains how Bismarck and Bach lay at the poles of Brahms’ life: on one end, politics and North Germany, and on the other, his musical heritage and roots. From that comparison, musical iconography was born.

Of late, Comini contributed to Stagebill for the Metropolitan Opera, writing essays on such works as Humperdinck’s Hansel and Gretel and Wagner’s Ring Cycle. Her lectures have been requested by orchestras, universities, and symposia around the globe, including the Leipzig Gewandhaus Symposia under conductor Kurt Masur. Her awards and honors are numerous, including the Grand Decoration of Honor from the Republic of Austria in 1990 and the Lifetime Achievement Award from the Women’s Caucus for Art in 1995.

In between her research quests, Comini continues to do what she loves most – teach. “The true joy of my research is that the information filters back into my classes,” she says. Her classes are filled not only with students, but also with auditors that range from Dallas Museum of Art docents to local physicians. In turn, Comini’s students have shown their appreciation for her devotion to teaching by selecting her “Outstanding Professor” eight times during her SMU career.

Comini, who earned a B.A., an M.A., and a Ph.D. in art history, respectively, from Barnard College, University of California-Berkeley, and Columbia University, originally planned to major in philosophy. “But when I took my first art history course at Barnard, I was hooked. The whole world was suddenly revealed to me.”

For the future, Comini hopes to delve into the life and images of Mendelssohn. Ultimately, she will bring it all home to the classroom.

“It is the teaching that matters most,” Comini says. “I’m far more interested in imparting information that will allow my students to develop their character and humanity than giving them knowledge they can just as easily look up. The ignition of the soul is what I’m shooting for. That’s where true fulfillment lies.”
Mythical and literary themes pervade recent paintings and drawings by Bill Komodore, professor of studio art in Meadows School of the Arts. Last year the Meadows Museum featured his work in the exhibition "Content Drive Form: Recent Work of Bill Komodore." A native of Greece, Komodore earned a B.A. and M.F.A. from Tulane University. He is represented in numerous museum and private collections, including the Whitney Museum of American Art, National Gallery of Art, and Dallas Museum of Art. Komodore won first prize in the exhibit "The Assistance League of Houston Celebrates Texas Art '97." He also received the 1997 Legend Award from the Dallas Visual Arts Center.