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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.
These are exciting times at Southern Methodist University. As we move closer to the 21st century, "the air is charged with electricity, the atmosphere is vibrant, the mood vigorous," according to an assessment made in a special report on SMU by D Magazine (January 1998). And there are good reasons for this excitement.

In April 1997 SMU launched a five-year $350 million Campaign for SMU: A Time to Lead, the largest fund-raising campaign ever for the University and the North Texas region. Funds are being raised to support scholarships, academic programs, faculty positions, and new initiatives, along with research and technology. State-of-the-art teaching and research facilities in life sciences and engineering are high on the list of priorities.

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 Enactments 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

Ludy Guerra, assistant professor of statistical science, Dedman College, is developing statistical methods to determine which genes underlie inherited tendencies toward high cholesterol. He is working with geneticist Jordan Cohen of the Center for Human Nutrition, Department of Molecular Genetics, at the University of Texas Southwestern Medical Center at Dallas.

"It's somewhat uncommon to find a strong collaboration between statisticians and researchers who are actually doing work in the lab," says Guerra.

Researchers at the University of Texas at Austin are working with Guerra and Cohen to identify the genes that influence cholesterol through drugs or diet; Cohen says. Several factors can contribute to high cholesterol, some of which are inherited, others of which involve nutrition and other environmental variables. Cohen shares genetic data collected from his laboratory with Guerra, who analyses it using statistical models that can separate genetic factors from environmental causes.

Working under a grant from the National Institutes of Health, they share data on a daily basis. In constructing statistical models, Guerra says, "we try to approximate something that makes biological sense. Although the models are specific to their cholesterol investigations, the principles behind them have applications throughout genetics research. The use of those principles could help medical researchers identify individuals who are likely to develop other genetically transmitted diseases.

Guerra and Cohen have co-authored numerous articles on the use of statistics in genetics research. Most recently they have been published in Proceedings of the National Academy of Sciences (1999) and Annals of Human Genetics (1997). Before joining SMU in 1991, Guerra taught at the University of California-Berkeley, where he received his Master's degree in mathematics and Ph.D. in statistics.

Network Capacity to Spare

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. With a $290,000 grant from the state, they have designed the model with help from their Ph.D. students.

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.
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.
heologist 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, and the powerful continued to enrich their lives at the expense of 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 some may 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 elicited 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 Original 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.

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AN ABSTRACT ART

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.
Bouncing the Universe into Focus

Plots 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 restoration — 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 the images, the mathematical problem is quite difficult, Nagy says. “Some very 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 as good 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 Reinelt’s 10-year research partnership with Andrew Kraynik, a chemical engineer at Sandia National Laboratories in New Mexico. Reinelt, 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,” Reinelt 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, Reinelt says.

Reinelt 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,” Reinelt says. For example, the suspect could be sprayed with a foam that becomes taffy-like on contact.

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

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CREATING
(A New)

Alessandra Comini

Art historian combines old and new
LESSANDRA COMINI’S RESEARCH has given rise to a new discipline – musical iconography, the study of pictures and images related to music. Comini, University Distinguished Professor of Art History in 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.

“For me, the connection between the arts and the images that filled his or her life – everything,” Comini says. “I call it the cultural content of artistic form. If I study the idols and images that created a

D i s c i p l i n e

I o l s and images to understand the facts of lives

composer’s life, what will they tell me? What have I discovered – the slides and pictures, the travels, the knowledge – no one else possesses these things in this context.”

Comini’s passion has led to her latest endeavors, which include expansive studies of Scandinavian art and music. During the last seven years, she has traveled throughout Scandinavia, allowing her journeys to take on lives of their own. “I take 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 method 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 himself as the great-grandson of Axel Gallen-Kallelle. “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

had ever been able to figure that out. I did it from a description in his letter to Alma of Gallen-Kallela’s motor boat arriving. And I sat in front of the same fireplace Mahler sat in front of at the home that Gallen-Kallela took him to. It was there the Finnish artist sketched him, creating a stunning portrait. And I have pictures of it all.” Comini published her discoveries in 1996 in the Dutch musicological journal Muuziek & Wetenschap.

Also in the Scandinavian vein, Comini has pursued her other chief interest under musical iconography – revisionism. “I’m working hard to resuscitate the women artists of Scandinavia.”

True to her mission, in a 1995 issue of Women Artists Journal, Comini published a major review of the oeuvre catalogue of Helene Schjerfbeck, a Finnish painter and contemporary of Gallen-Kallela. Schjerfbeck has been chiefly ignored because “while Gallen-Kallela painted large murals, she painted small portraits,” Comini says.

Other women Comini has successfully 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 also has 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

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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 mer...
“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 Southwestern 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; and 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 choice 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 internal competition on a salesperson’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 Brueggeman, the Clara R. and Leo F. 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

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VARIOUS 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 Godbey 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 Regional 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, $44,000, “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.

The Doctor of Philosophy degree is offered by the Departments of Anthropology, Biological Sciences, Economics, Geological Sciences, Mathematics, Physics, Psychology, and Statistical Science in Dedman College; Computer Science and Engineering, Electrical 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 Herrin, 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 Leeman 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 sufferer 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 Clements 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
imburse among pro-oxidant production, antioxidant defenses, and repair processes, which result in the accumulation of oxidative 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 overexpressing different antioxidants may be crossed with each other, generating new strains with increased levels of multiple defensive enzymes.

ARUHATI NANDY, Economics, is conducting research on international and environmental economics under Assistant Professor Thomas Olsang. Her dissertation investigates the effects of environmental regulation on various economic indicators, such as international competitiveness of industries, firm-level profits, aggregate resource usage, and economic growth. The dissertation also addresses the effects of emission externalities - the growth rate and the demand for natural resources in an economy; examines the impact of environmental regulation on firm-level profits in a Cournot duopoly; and investigates whether environmental compliance costs have affected the international competitiveness of U.S. manufacturing industries.

SANTI RAGHAVENDRAN, Economics, is conducting research in the area of financial economics under Associate Professor Greg Huffman. His dissertation constructs and analyzes a model in which agents purchase and sell various types of productive capital, a model that is considerably different from what is usually employed in literature. The framework is a random-mating model, in which agents are randomly paired with each other, who then decide whether to exchange capital for good. Most other models have competitive asset-markets in which buyers or sellers of capital can interact with many other agents. In contrast, Raghavendran's model allows agents to interact with only one other agent at a time and stipulates the quantity of the various types of capital that are exchanged and the prices at which the exchanges take place. The model can be used to investigate the impact that various government policies can have on the asset market.

MAHER SARRAJ, Electrical Engineering, is supervised by Milt Glosney, 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 feedback 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, noninvasive temperature measurements in critical areas of active IC and MMIC devices.

DONNA YARRI, 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 processes, 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 borderline 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."
Myth 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.