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The next challenge facing today's businesses is sustainable production; companies like Interface are setting the standard for renewing resources for the 21st century.
By Ray C. Anderson

Going the Distance
New developments in Internet-based instruction promise to expand and extend Georgia Tech's educational offerings worldwide.
By Gary Goettling

Range Rovers
Wild West Jeep Tours gives tourists a chance to experience the Old West on "horse (power)back"—and learn about the ecosystems of the Southwest.
By Shawn Jenkins

Anatomy of a Hesburgh Award
In February, Georgia Tech received the Theodore M. Hesburgh Award, the most prestigious award for teaching given an American institute of higher education.
By Dave McGill

Cover: Ray Anderson, chairman and CEO of Interface, and author of Mid-Course Correction, says industry must lead in saving the environment.
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Bailing Out on Seidell

Professor Thomas G. Seidell taught electrical measurements in the original electrical engineering building. In my day, I judged him to be in his middle-to-late 70s. His eyesight was quite poor and he always brought three pairs of glasses to class: one for calling the roll and reading; one for writing on the blackboard, and one for lecturing.

The building was quite antiquated and without air conditioning. Consequently, classroom windows were open in the spring and summer. His classroom was on the first floor. It's safe to say no class at Tech enabled so many cuts. While switching from his roll calling/reading glasses to one of the others, feet could be heard hitting the concrete outside. These belonged to those bailing out through the windows, having used all their allotted cuts. Poor Professor Seidell never witnessed this exodus and no "upright" classmate ever betrayed the defectors. Had he suspected such a ritual, he might have been able to pinpoint the guilty by making some sort of grade correction or even stationing a campus guard outside the windows. I can only hope they enjoyed their illicit leisure, because some of them had to repeat the class.

H. S. "Hal" Branch, EE ’51
Goodlettsville, Tenn.

Starting the Millennium

I was disappointed to read the letters (about the coming millennium) in your magazine from alumni who seem not to have thought very carefully about how our calendar works. Consider your 20th birthday. It was celebrated at the end of your 20th year of life (during which you were 19) and the start of your 21st year—the start of your third decade.

By the same reasoning, 1 January 2000 will be the day after the end of the 2000th year—1999 of our Christian calendar—the start of 2000, and will be the start of the 2001st year—the beginning of the third millennium.

It's a simple problem in logical mathematics.

Myrick Hilsman, EE ’51
Huntsville, Ala.

Sideways Had His Moments

The winter 1999 edition of the Alumni Magazine brought back great memories of Georgia Tech and our faithful pet, Sideways. I was there in the Navy V-12 program from March ’44 'til June '46. Part of the time I lived in Techwood Dorm and recall Sideways' appearance on campus and his life there. The highlight of his career must have been on the night of the Inter-Fraternity Council Dance.

I was with my date (now my wife of 52 years). The dance was in the gym. If I remember correctly, Sammy Kaye and his band were there to provide the music.

We were standing around the edge of the floor waiting for all the fraternity presidents and their dates to get together to do the leadoff dance. At that moment, Sideways ambled in from the north door and walked right out to the middle of the floor, lifted

Smith Was Gem of a Teacher

The 75th anniversary edition of the Georgia Tech Alumni Magazine is a gem. As a retiree, I’ve read it several times, and will keep it with my memorabilia forever.

The absolute highlight of my academic career at Tech was my three quarters of calculus under Professor D.M. Smith. I can still hear him referring to our class as a bunch of hopeless "Swamp Bunnies" incapable of absorbing his teachings. He, however, made calculus very easy for us, never used a textbook and taught us to take organized notes in such a way that, upon completion of the course, we had a reference document superior to any textbook. His teachings better enabled me to finish my education at Tech with a 3.2 GPA, and succeed in both a 14-year professional career as an engineer, consultant and division manager, and a 27-year career of self-employment.

Dr. Smith was a small, white-haired gentleman with a noticeable limp caused by a short leg. He always wore a black suit with a bow tie. I can still see him tooling around campus in his 1930’s black coupe automobile, the model being very similar to the Ramblin’ Wreck of today. At the end of each quarter, after final exams, he would announce the final grades to the entire class. On one occasion, I took the final exam, breezed through it with no problem, finished early, turned in my paper and left. On the way back to Techwood Dorm, I was going over the exam in my mind and realized that I had made a simple math error at the end of one of the problems. I had solved the problem correctly but had given the wrong answer due to the error. I turned around, rushed back to the old math building on the hill and found Dr. Smith in his office grading the papers. I told him about my error and what the correct answer should be. He looked at me, grunted, and didn’t say a word. During the next and last class he announced the final grades as usual, alphabetically. When he got to my name he roared “Mr. Lutter, a MIGHTY WEAK ‘A.’” I’ll never forget that or the good-natured kidding I got from my friends in the class.

Fred C. Lutter, EE ’55
Palm Coast, Fla.
one leg and relieved himself. Everyone cracked up. Sammy Kaye was laughing so hard I thought he was going to fall off the bandstand. The puddle was quickly wiped up and the dance went on.

It is great to know that Sideways is still remembered by his grave marker.

Billy Wallace, EE ‘46
Stillwater, Okla.

Griffin Earned His Stripes

In the winter 1999 Alumni Magazine, there was a letter mentioning George Griffin when he was in his 90’s reading a book about World War II that I wrote: The Naval Night Battles in the Solomons. I gave George a copy of the book in his office shortly after it was published in 1987.

In addition to his academic career as Tech’s beloved dean of students, George had a notable Naval career. He served active duty in the Navy during World War I and World War II and came up through the ranks to a four-stripe captain—without having command duty at sea, an almost unheard-of feat. To justify this honor, which came when the war was almost ended, George was made commanding officer of the receiving station at Pearl Harbor. Since Hawaiian duty was classified as “sea duty,” protocol was appealed. Old timers said it could not be done: They didn’t know our George.

Bill Kilpatrick, IM ‘42
Coral Gables, Fla.

Gymnastics Deserves Recognition

I have enjoyed the Alumni Magazine—especially the 75th Anniversary edition. Yet, there is one aspect of Tech sports that I have never seen mention of—men’s gymnastics.

An important part of my life in Georgia Tech athletics was as a member of the men’s gymnastics team during 1971-77. I went through the freshman physical education gym class, then worked with the men’s team as they took on the major competitors, including the University of Georgia, Georgia Southern and Memphis State.

We all worked together in advertising, equipment maintenance, and promotion to generate interest in what was called a minor sport. In spite of our course loads, our competitiveness improved to where in 1975, nationally ranked schools such as the University of Indiana and LSU accepted our invitation to compete. The spectators filled the old gym until it was standing-room-only during the LSU meet.

Coach Bill Beavers did an outstanding job as coach and a member of the team, despite cutbacks and seeming disinterest on the part of the Athletic Association. During this time, equipment and facilities were provided for women’s gymnastics, and several of my teammates and I helped out with teaching them, although the level of support for them was far below what it was for the men.

It hurt a great deal when I heard that support for gymnastics at Tech had been discontinued. For all the books that have come out concerning sports at Georgia Tech, mention should be made of the efforts of coaches Lyle Welser and Bill Beavers as well as the players that made Georgia Tech a name in gymnastics in the South.

Steve Lubs, EE ‘77
Brooklyn Park, Md.
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Tech Names **First Woman Dean**

Anthropology Professor Sue Rosser, director of the Center for Women's Studies and Gender Research at the University of Florida, has been named dean of the Ivan Allen College.

Rosser will be the first woman to serve as dean of an academic college in Georgia Tech's 110-year history.

She begins her new position in July.

Rosser was named professor of anthropology at Florida in July 1995, and she also directed the women's center.

From July 1994 to December 1995, she was senior program officer for Women's Programs at the National Science Foundation. From 1986 to 1995, she served as director of Women's Studies at the University of South Carolina, where she also was a professor of Family and Preventive Medicine in the medical school.

"Dr. Rosser's background in science, combined with her National Science Foundation and administrative experience, is extremely valuable," said Dr. Michael Thomas, provost and vice president for Academic Affairs. "Both the faculty and student members of the search committee were impressed by her vitality, vision and strong personal integrity. She is ideally suited to head our Ivan Allen College as the place where the humanities, social sciences and technology most closely converge."

Rosser has researched and published extensively on topics related to women in science fields. Her most recent book, Re-Engineering Female Friendly Science, was published by Teachers College Press at Columbia University in 1997. She has served on several editorial boards and currently serves on the editorial boards of the National Women's Studies Association Journal and Women's Studies Quarterly.

She has held several grants from the National Science Foundation, including "A USC System Model for Transformation of Science and Math Teaching to Reach Women in Varied Campus Settings" and "POWRE Workshop."

Rosser received her doctoral degree in zoology from the University of Wisconsin-Madison in 1973. She earned both her undergraduate and master's degrees from Wisconsin-Madison as well.

The search committee included at least one representative from each school in the Ivan Allen College and three students.

"Dean Rosser is a nationally distinguished scholar with a strong foundation in the sciences and science education," said Thomas Boston, head of the search committee and professor of economics.

"Her science background allows her to communicate easily with the deans and administrators of the science and engineering programs, and she easily bridges the gaps between science, engineering, social sciences and humanities."

The Ivan Allen College at Georgia Tech includes the schools of Economics; History, Technology and Society; the Sam Nunn School of International Affairs; Literature, Communication and Culture; and Public Policy. Other departments housed within the college are Air Force ROTC, Military Science, Modern Languages and Naval Science. Research centers in the college are the Center for International Strategy, Technology and Policy; and the New Media Center.

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**Tech Dominating in Online Jeopardy**

Georgia Tech students are flexing their knowledge of "potent potables" on an Internet version of the popular TV gameshow, "Jeopardy."

"College Jeopardy Online" is the latest craze among student trivia buffs, whose accumulated point totals count toward a team score for their schools in a nationwide competition.

The cyberspace format is similar to the original—sans Alex Trebek—as participants choose from six categories with varying point values depending on question difficulty. Answers aren't phrased in the form of a question, but are selected from a multiple choice list.

Tech held a substantial point margin on runner-up William & Mary in March, and would qualify for an on-campus audition for the show should it finish No. 1 when the contest ends on May 24.

Readers with trivial minds should go to <www.station.sony.com/jeopardy>.
Price Returns to Coach Yellow Jackets

Mark Price, the unexpected hero of Bobby Cremins' powerhouse basketball teams of the mid-'80s, returned to the Thrillerdome in March as an assistant coach.

Price announced he would take the non-recruiting assistant's job about a month after he ended a 12-year career in the National Basketball Association, where he still holds the record for shooting percentage with 90.4 percent.

He was released by the Orlando Magic and was not picked up by another team after the NBA lockout ended.

"Ever since Mark retired, he's been thinking about getting into coaching," Cremins said. "The opportunity to have him on our staff is just tremendous for us. Mark will be heavily involved in individual player development and all aspects of coaching. He has my utmost respect as a person and a player."

Price takes over for Gary Leiner, who will assume the non-coaching duties of Frank Beall, exiting for private business. Meanwhile, assistant coach Derek Whittenberg has taken a head coaching position at Wayne College in New York.

The 35-year-old Price joined the Yellow Jackets in 1983 and helped lead Tech to their first NCAA tourney since 1960 that year, as Tech went all the way to the round of eight.

"It's a thrill to be able to come back to my alma mater and be a part of Cremins' coaching staff," Price said. "I feel I can be an asset in development of players. I look forward to helping in any way I can."

The former guard took over assistant coaching duties immediately.

North Avenue Almanac

75 Years Ago—When the Birmingham, Ala., Georgia Tech Club was launched in 1924, it was an occasion for some horsing around. William Moses Jr., one of the 12 alumni to found the club, announced they would field a polo team.

50 Years Ago—The headline was wrong and Harry Truman won the presidential election. Alumnus Carter T. Barron was chairman of the Inaugural Parade and Special Events Committee during the Jan. 19, 1949, inauguration for President Truman. Barron, a 1926 commerce graduate, was a past president of the Georgia Tech Club of Washington D.C. and division manager of Loew's Eastern Division of Theaters.

25 Years Ago—Franklin C. "Pepper" Rodgers, who had thrilled fans as the quarterback of some of Bobby Dodd's illustrious teams, returned to Georgia Tech as head football coach. Rodgers, IM '55, built a reputation as an unorthodox—but winning—coach at Kansas and UCLA. Said one prairie sage, "Four years of Pepper Rodgers is like opening a box of Cracker Jacks every day."
"Good Day Atlanta"
Good for Tech

Atlanta's Fox 5 set up shop on the Georgia Tech campus March 18 to do a live television broadcast of its morning show, "Good Day Atlanta," from the Georgia Tech plaza near the Kessler Campanile.

In addition to serving as a backdrop—with the Ramblin' Wreck, Buzz, the Georgia Tech pep band and cheerleaders on hand—the Institute was the focus of the three-hour program, which included stories on Tech's recent Hesburgh Award for undergraduate teaching; tissue engineering; the Microelectronics Research Center; microneedles research; Tech sports figures Bobby Cremins, George O'Leary, Keith Brooking and Matt Kuchar; Classroom 2000; Project Yamacraw; DramaTech; the Homer Rice Center for Sports Performance; and the Georgia Tech master plan, including a 3-D animation of the future campus.

The Fox affiliate also recruited Tech students to assist in production of the show and to serve as "extras."

Winstel Outstanding Young Alumna

A 1984 industrial management graduate was named the Alumni Association's 1998 Outstanding Young Alumna. A panel of Association and Institute volunteers selected Kimberly Krabe Winstel for the annual honor in recognition of her support for Georgia Tech, professional achievement and commitment to the community.

An assistant vice president and community relations officer for the Federal Reserve Bank of Atlanta, Winstel is a member of the DuPree College of Management advisory board of directors and a visiting professor in the college.

Formerly with the Federal Reserve in Jacksonville, she was named to the Community College of Jacksonville board of trustees and foundation, where she held leadership roles. She also was active in leading the Jacksonville Georgia Tech Club.

Winstel has been a regular contributor and supporter of the annual Roll Call and the Athletic Association's Alexander-Tharpe Fund. She is a member of the Georgia Tech Foundation Founder's Council.

According to Dr. H. Wade Barnes, who nominated Winstel for the honor, she has given more than 500 hours of community service since returning to Atlanta in 1997.
Accelerated Summer Session Eases Transition to Semesters

Georgia Tech will use the summer 1999 term to act as a pivot point in the change from the quarter system to the semester system, which goes into effect fall 1999.

In a format similar to the compressed summer term during the Olympics, classes will be held for seven weeks with one week of finals.

“There is a new rhythm we need to establish,” says Annette Satterfield, associate registrar. “We’re used to living in 11-week cycles. Now it’s a 16-week rhythm that will affect faculty, students and the administration.”

Due to the decreased number of summer classes offered and the potential for added pressure on freshmen who would be taking courses for semester credit in a shortened session, Enrollment Services has put a freeze on accepting freshmen and transfer students for the summer term.

Those students receiving financial aid for the summer session will have the benefit of a separate financial-aid cycle, which the Office of Student Financial Planning and Services has set up to ease the transition to the semester system.

Immediately following the summer term, the registrar’s office will move into high gear to handle the various conversions required for the change-over. With only a one-week turnaround this year between summer and fall sessions, they must process all grades, convert all academic records from quarter to semester, run end-of-term reports and enter all data for fall registration.

Appalachian Trailblazer

Alumnus Warner W. Hall is a familiar face to hikers of the Appalachian Trail—his image is on the monument marking the southernmost point of the 2,160-mile trail at Georgia’s Springer Mountain. Hall, CE ’25, was founder of the Georgia Walking Club, which in 1930 became the Georgia Appalachian Trail Club. A former president of the club, Hall was immortalized on the trail monument in 1934 by Atlanta sculptor G. H. Noble. Silhouettes of the monument have become a logo for the Georgia Appalachian Trail Club, an association of volunteers that continues to manage and maintain the trail in Georgia. Starting at Springer Mountain, the Trail takes hikers along the ridge of the Appalachian range to Mt. Katahdin in Maine.

French Fast-Food

Alumnus Frederic Lacoste, Mgt ’97, is giving fast-food a French twist on campus. Lacoste, who learned the art of crepe-making growing up in Paris, is owner, manager and chef at Cruspus (Latin for crepes), a campus creperie and cafe in the Couch Building. In 1996, as a fundraiser, Lacoste and other French students enjoyed success selling their delicate delicacies in front of the Student Services building.

Creative Difference

“The only thing that separates animals from humans is that humans can be creative,” said Dr. Henry J. Heimlich, inventor of the Heimlich maneuver, speaking at Tech about creativity in biomedical engineering. “Animals can love. They can fight. They can take care of themselves. But they cannot be creative.” Heimlich added, “Yet many of us never take advantage of that opportunity to be creative.”

Pint-sized Dragon

Approximately 250 pupils from neighboring Centennial Place Elementary School—some of whom formed a pint-sized dragon—paraded onto campus Feb. 27, celebrating the Chinese New Year: the Year of the Rabbit. Participants, dressed in red for good luck, stopped by the Registrar’s Office, where staff members (some of whom had youngsters in the entourage) passed out red packets of gold-colored coins, signifying good luck. In that regard, the school has a very desirable address—slap dab on Luckie Street.
Children attending Centennial Place Elementary School—a Georgia Tech neighbor—were in tune for the sound of music when the Canadian orchestra I Musici de Montreal gave a classical performance at Tech’s Robert Ferst Center for the Arts in February.

Orchestra members met with pupils and parents, explaining the instruments and the range of moods that classical music evokes.

The program was funded by the Lila Wallace-Reader's Digest Fund and The Community Foundation for Greater Atlanta, to expose the students from the Luckie Street school to acclaimed artists performing at the Ferst Center.

The Arts Education Program—begun in September—includes workshops hosted by performing artists, incorporating the arts concepts into teachers’ lesson plans and bringing parents to the theater for world-class performances.

Six performing groups are participating in the interactive workshops. Performers introduce concepts related to their work, such as timbre and pitch by the Boys Choir of Harlem. Body conditioning and stage lighting were taught by the dance troupe Cortez & Company, and music’s emotions by I Musici de Montreal.

To prepare the kids for attending these performances, Virginia Sheppard, Tech’s grant coordinator for the Arts Education Program, teaches the children theater and concert etiquette.

“I explain to the kids the importance of being on time, when to clap, and not to talk during the show,” Sheppard says. “This helps the kids to better enjoy the performances and teaches them a real-life skill of expected behavior.”

Other artists participating in this year’s program include the chamber group The Ahn Trio, March 17; classical guitarist Christopher Parkening, March 26; and the acclaimed pianist Awadagin Pratt, April 9.

Centennial Place opened its doors for the first time for the 1998-99 school year as a prototype, state-of-the art theme school focusing on science, mathematics and technology.

Conference Recognizes Tech’s Women of Distinction

Space veteran Jan Davis remembers being told that she was “nuts” to want to go to Tech, to want to work at NASA and to think she could make it into the astronaut program.

Having done all three, Davis, Biol ’75, inspired other women to hold onto their dreams as she gave the keynote address at Georgia Tech’s Women’s Leadership Conference in February.

“You can’t believe the things people tell you,” said Tech’s first female astronaut. “You must keep your dreams. If you do, they will become your reality.”

The two-day, student-led event honored Davis—now director of NASA’s Human Exploration and Development of Space program—as its outstanding alumnus and recognized three other Tech women with the 1999 Women of Distinction awards.

Receiving the awards are (l-r) Billiee Pendleton-Parker, assistant director of the Center for the Enhancement of Teaching and Learning; Marilyn Smith, assistant professor in the School of Aerospace Engineering; Davis; and Aimce Parsons, a senior majoring in chemical engineering.

“Remember that we as women have a network,” said U.S. Representative Cynthia McKinney, who spoke at the conference luncheon. “We share a common bond. And always remember that the women who have gone before us are the foundation of who we are and how we got here.”
Leader of the Pack

Quantum Leap, a collie owned by Dr. Cindi Bossart, Biol 74, a Fort Lauderdale, Fla., veterinarian, and her husband, Jim Efron, took top honors in the 123rd Westminster Kennel Club Dog Show. “He is the No. 1 collie in the United States,” Bossart beams.

Quantum Leap, a “rough collie,” carries the show name “Ch Glenhill Argent Quantum Leap.” He has distinctive markings, and his facial features are split between a tri-color and blue merle dog. He is also a “Purina Chosen By Champion” dog, appearing in the company’s advertisements.

Bossart, who earned her veterinary degree from the University of Pennsylvania, owns the Animal Hospital of Fort Lauderdale, Fla. She has raised collies for show for 12 years. “It’s a labor of love,” Bossart says, and jokes, “I’m a veterinarian so I can support my animal habit. I love the sport of dog showing. I love the pomp and circumstance that goes along with it. I love the competition. I like trying to breed a better and better dog.”

Bossart has bred five champion dogs at home, and owned and trained 26 champions. “Collies in general are born with a cum laude degree,” she says. “They’re incredibly intelligent. We start training our puppies when they are eight weeks old.”

Quantum Leap, who is five years old, started his show career when he was six months old. He competes in shows 42 weekends each year. “He’s so fine-tuned he could probably do it himself,” Bossart says. “He’s a marvelous animal—beautiful and brilliant.”

Women Engineers

Tech’s College of Engineering graduated the largest number of female engineers (total degrees) in the nation from 1991 to 1997. In addition, the percentage of female faculty grew from 1 percent to 8 percent over the decade 1987 to 1997.

Those facts are part of the “Enhancing the Environment for Success” report just issued by the College of Engineering. The report outlines specific recommendations to firmly establish Georgia Tech as the leading institution for women pursuing an engineering education and career.

Specific goals include increasing the percentage of female graduate students in engineering and the numbers of women in senior faculty positions. Recommendations include developing flexible work-family policies and programs, such as family leave and modified work options after childbirth.

A synopsis of the report can be found at www.coe.gatech.edu/wie.html. For more information or a copy of the full report, contact April Brown at april.brown@ee.gatech.edu.

Ramblin’ ’Cross Campus

Tech Ranks No. 3 Among Engineering Graduate Schools

In its recent ranking of the nation’s top graduate schools, U.S. News and World Report placed Georgia Tech No. 3 overall as the best institution for an engineering education, also judging it among the best in business, computing and sciences. The Massachusetts Institute of Technology was rated first on the engineering list, followed by Stanford University.

“I’m very pleased that the impressive work of our faculty and students is so highly regarded at the national level,” President Wayne Clough said. “Graduate education is extremely important as we continue to transition to a high-tech, information-based economy.”

The Institute’s School of Industrial and Systems Engineering was ranked No. 1 for the ninth year in a row, while several other engineering programs broke the top 10, including aerospace (No. 5), electrical (No. 7), mechanical (No. 7), biomedical (No. 8), civil (No. 8) and environmental (No. 8).

Tech’s non-engineering accolades were awarded to the College of Computing (No. 13), the DuPree College of Management (No. 33) and the School of Physics’ non-linear/chaos program (No. 5), which broke the top 10 for the first time.
Building Boom

Q. What's the official bird of Georgia Tech?
A. The construction crane.
The frenzy of campus construction that started when Georgia Tech became the official perch for Olympic athletes in 1996 shows little sign of slowing as The Campaign for Georgia Tech provides a fertile habitat for the construction crane.

As Tech readies itself to meet the educational challenges of a new century and a new millennium, the flock of new projects spans the campus—from the materials lab on "Tech's other campus" across the tracks to the expansive new center for biosciences, according to William "Bill" Miller, CE '62, MS CE '71, manager of capital projects.

And every improvement—every contribution to Tech's ability to educate the engineers, managers and scientists of tomorrow—relies at least in part on dollars raised from the Institute's alumni and friends.

In March, workers moved equipment and supplies into the $6.9 million Structural Engineering and Materials Research Lab, an imposing metal building painted a checkerboard of Tech yellow and white off North Avenue beyond the Coca-Cola Co. headquarters and the Marietta Street viaduct.

The $4 million Sustainable Education Building has taken shape on Atlantic Drive between the chemical engineering and civil engineering buildings. And the $30 million building that will house the Petit Institute for Bioengineering and Biosciences—made possible through private funding, grants and the Georgia Research Alliance—appears near completion from the outside, though much work remains inside the modern, brick and glass structure.

Just downhill from the Student Athletic Complex on Ferst Drive is an exception to the private-funding norm, the $27.3 million Manufacturing Related Disciplines Complex Phase II, now just a concrete skeleton.

Raising money to build such new facilities is crucial, says Barrett Carson, vice president for development.

"It's something we absolutely must do," Carson says. "We must get these buildings up faster than the normal protocol would call for."

Raising private money for public buildings is "a given at Georgia Tech," a reality that goes back to the Institute's earliest history, Carson says, citing the Carnegie building, Tech's original library, as an example. "It's not named after a deli in New York; it's named after Andrew Carnegie. "We're simply trying to leverage additional state dollars in the process."

For example, the Environmental Science and Technology Building, a $58 million structure, will require $15 million in private money, Carson says. Likewise, the 25-year-old Student Athletic Complex "is in need of renovation," he says. The expansion also will enclose the Olympic aquatic center.

"It will be absolutely stunning," Carson says. Georgia Tech must raise a minimum of $12 million in private money—$7 million by this summer—for the facility.

An advanced computing facility currently on the drawing board will require at least $8 million in private funding.

As President Kenneth Gordon Matheson said of Tech during the first capital campaign in the 1920s, "When Georgians realize its value, as they certainly will, they will demand and provide the generous and adequate support necessary for its maximum efficiency. This is my prayer and belief."
The Next Industrial Revolution

By Ray C. Anderson
Photography by Caroline Joe
On a Thursday in April 1996, I was in Boston speaking to 500 people. The subject was "Planning for Tomorrow," and the panel was about technology's role and impact on the strategic decisions companies make. The discussion was sponsored by the International Interior Designers Association. The audience was about one-third interior designers and two-thirds business people, including some of my company's competitors.

While the subject of the discussion was technology, I think the audience's understanding of the term probably had to do with the technology in the offices where most of them worked—information technology: office automation, computers, e-mail, radio mail, laptops, word processors, CADs, telephones, voice mail, video conferencing, faxes, Internet, intranets, websites and so on. There is an infinite variety of gadgets, networks and servers that helps us store information, manipulate information, do arithmetic faster, retrieve information, transmit information, receive information and examine information—in written form, spoken form, picture form, virtual-reality form. Technology gives us faster, surer information when we want it and where we want it, in whatever form we want it. Understanding the information and using it wisely, of course, is then up to you and me. We're on our own in developing the wisdom and knowledge and understanding to make the information useful.

That's my mental map of what most people, especially people who work in offices, are thinking and meaning when they talk about technology. But I checked out the definition of "technology" in The American College Dictionary:

"1A. The application of science, especially to industrial or commercial objectives; 1B. The entire body of methods and materials used to achieve such industrial or commercial objectives; 2. The body of knowledge available to a civilization that is of use in fashioning implements, practicing manual arts and skills, and extracting (emphasis added) or collecting materials."

So, there's quite a lot there that we don't find if we just look in the office: technology that is not electronic, that is not about storing, manipulating, sending, receiving and examining information. There's chemical technology; mechanical technology; electrical, civil, aeronautical and space technologies; construction, metallurgical, textile, nuclear, agricultural, automotive technologies; now even biotechnology; and so forth.

I illustrated the point for my Boston audience with an example:

I told them that I run a manufacturing company that produced and sold $802 million worth of carpets, textiles, chemicals and architectural flooring in 1995—and would likely sell $1 billion worth in 1996—for commercial and institutional interiors. Now we have offices, too, chock full of office technology: mainframes, PCs, networks; you
"My company's technologies and those of every other company I know of anywhere, in their present forms, are plundering the earth. This cannot go on and on and on."

name it. And people who are hotelling and teaming, working anywhere, anytime. Information technology makes it all possible, hooking us up around the world.

But we also operate factories that process raw materials into finished, manufactured products that, happily, many members of my Boston audience routinely use and specify for others to use, and our raw material suppliers also operate factories. And when we first examined the entire supply chain comprehensively, we found that in 1995, the technologies of our factories and our suppliers, together, extracted from the earth and processed 1.224 billion pounds of material so we could produce those $802 million worth of products—1.224 billion pounds of materials from Earth's stored natural capital. I asked for that calculation, and when the answer came back, I was staggered.

Of the roughly 1.2 billion pounds, I learned that about 400 million pounds was relatively abundant inorganic materials, mostly mined from the Earth's lithosphere (its crust), and 800 million pounds was petro-based, coming from either oil, coal or natural gas. Roughly two-thirds of that 800 million pounds of irreplaceable, non-renewable, exhaustible, precious natural resource was burned up to produce the energy to convert the other one-third, along with the 400 million pounds of inorganic material, into products.

That fossil fuel, with its complex, precious, organic molecular structure, is gone forever—changed into carbon dioxide and other substances, many toxic, that were produced in the burning of it. These, of course, were dumped into the atmosphere to accumulate, and to contribute to global warming, to melting polar ice caps, and someday in the not too distant future, to flooding coastal plains, such as much of Florida and, in the longer term, maybe even the streets of Boston (and New York, London, New Orleans, and other coastal cities). Meanwhile, we breathe what we burn to make our products and our livings.

My company's technologies and those of every other company I know of anywhere, in their present forms, are plundering the earth. This cannot go on and on and on.
However, is anyone accusing me? No one but me. I stand convicted by me, myself, alone, and not by anyone else, as a plunderer of the earth. But by our civilization's definition, I am a captain of industry.

In the eyes of many people, I'm a kind of modern-day hero, an entrepreneur who founded a company that provides over 7,000 people with jobs that support them, many of their spouses, and more than 12,000 children—altogether some 25,000 people. Those people depend on those factories that consumed those materials.

Anyway, hasn't Interface paid fair market prices for every pound of material it has bought and processed?

Doesn't the market govern?

Yes, but does the market's price cover the cost? Well, let's see. Who has paid for the military power that has been projected into the Middle East to protect the oil at its source? Why, you have, in your taxes. Thank you very much. And who is paying for the damage done by storms, tornadoes and hurricanes that result from global warming? Why you are, of course, in your insurance premiums. Thank you again. And who will pay for the losses in Florida and the cost of the flooded, abandoned streets of Boston, New York, New Orleans and London someday in the distant future? Future generations, your progeny, that's who. (Bill McDonough, Dean of the School of Architecture at the University of Virginia, and a leading proponent of "green" architectural design for many years, calls this intergenerational tyranny, the worst form of remote tyranny, a kind of taxation without representation across the generations, levied by us on those yet unborn.)

And who pays for the diseases caused by the toxic emissions all around us?

Guess!

Do you see how the revered market system of the first industrial revolution allows companies like mine to shift those costs to others, to externalize those costs, even to future generations?

In other words, the market, in its pricing of exchange value without regard to cost or use value, at the very least is opportunistic and permissive, if not dishonest. It will allow the externalization of any cost that an unwary, uncaring or gullible public will permit to be externalized—caveat emptor in a perverse kind of way. My God! Am I a thief, too?

Yes. By the definition that I believe will come into use during the next industrial revolution. (I didn't originate that term. Business writer Paul Hawken and architect Bill McDonough have called for "the next industrial revolution," an idea that, as you can see, I have latched onto, because I agree with them that the first one is just not working out very well, even though I am as great a beneficiary of it as most anyone.)

To my mind, and I think many agree, Rachel Carson, with her land-
“By my own definition, I am a plunderer of the earth and a thief—today a legal thief. The perverse tax laws, by failing to correct the errant market to internalize those externalities such as the costs of global warming and pollution, are my accomplices.”

mark book, *Silent Spring*, started the next industrial revolution in 1962, by beginning the process of revealing that the first industrial revolution was ethically and intellectually heading for bankruptcy. Her exposure of the dangers of pesticides began to peel the onion to reveal the abuses of the modern industrial system.

So, by my own definition, I am a plunderer of the earth and a thief—today, a legal thief. The perverse tax laws, by failing to correct the errant market to internalize those externalities such as the costs of global warming and pollution, are my accomplices in crime. I am part of the endemic process that is going on at a frightening, accelerating rate worldwide.

There is not a company or institution of any kind that is sustainable in the sense of meeting its current needs without in some measure depriving future generations. When Earth runs out of resources and ecosystems collapse, our descendants will be left holding the empty bag. Someday, people like me may be put in jail. But maybe, just maybe, the changes that accompany the next industrial revolution can keep my kind out of jail.

As maybe you can tell, I’ve seen the light on this—a little late, admittedly. But I have challenged the people of Interface to make our company the first industrial company to attain environmental sustainability, and then to become *restorative*, to put back more than we take. The way to become restorative, we think, is first to become sustainable ourselves, and then to help or influence others.

Sustainability will depend on and require the vital technologies of the next industrial revolution. I don’t believe we can go back to preindustrial days; we must go on to a better industrial revolution than the last one, and get it right this time.

But what does that mean? I have read Lester Thurow’s view that we are already in the third industrial revolution. He holds that the first was steam powered; the second, electricity powered; making possible the third, which is the information revolution, ushering in the information age. Clearly, all three stages have emerged with vastly different characteristics, and each was revolutionary in scope.

However, I take the view that they all share some fundamental characteristics that lump them together with an overarching, common theme. They were and remain an unsustainable phase in civilization’s development.

For example, someone still has to manufacture your 10-pound laptop computer, that icon of the information age. On an “all-in” basis, counting everything processed and distilled into those 10 pounds, it weighs as much as 40,000 pounds. And its manufacturers, going all the way back to the mines (for materials) and wellheads (for energy), created huge abuse to Earth through extractive and polluting processes to make it. Not much has changed over the years except the sophistication of the finished product. So I refer to all three of those stages collectively as the first industrial revolution, and I am calling for the next truly revolutionary industrial revolution. This time, to get it right, we must be certain it attains sustainability.

At Interface, we have undertaken a quest, first to become sustainable and then to become restorative. And we know, broadly, what it means for us. It means creating and adopting the technologies of the future—kinder, gentler technologies that emulate nature. That’s where I think we will find the model.

Someone has said, “A computer, now that’s mundane, but a tree, that’s technology!” A tree operates on solar
energy and lifts water in ways that seem to defy the laws of physics. When we understand how a whole forest works, and apply its myriad symbiotic relationships analogously to the design of industrial systems, we'll be on the right track. Ultimately, I believe we must learn to operate off current income the way a forest does—not off of stored natural capital—but off current energy income. Solar energy is current energy income, arriving daily at the speed of light and in inexhaustible abundance from that marvelous fusion reactor just eight minutes away.

Those technologies of the future will enable us to feed our factories with recycled raw materials—closed loop, recycled raw materials that come from harvesting the billions of square yards of carpets and textiles that have already been made—using those precious organic molecules over and over in cyclical fashion, rather than sending them to landfills, or incinerating them, or downcycling them into lower value forms by the linear processes of the first industrial revolution. Linear must go; cyclical must replace it. Cyclical is nature's way.

Recycling operations will have to be driven by renewable energy, too. Otherwise, we will consume more fossil fuel for the energy to recycle than we will save in virgin petrochemical raw materials. We want a gain, not a net loss.

But if we get it right during the next industrial revolution, we will never have to take another drop of oil from the Earth for our products or industrial processes. That epitomizes my vision for Interface.

Those technologies of the future will enable us to send zero waste and scrap to the landfill. We're already well down this track at Interface. We have become disciplined and focused on what is sometimes called the "low-hanging fruit," the easier savings to realize. We named this effort QUEST, an acronym for Quality Utilizing Employees' Suggestions and Teamwork. In the first three-and-a-half years of this effort, we reduced total waste in our worldwide business by 40 percent, which saved $67 million (hard dollars), and those savings are paying the bills for all the rest of this revolution in our company. We are on our way to saving $80 million or more per year when we reach our goals.

We're redesigning our products for greater resource efficiency, too; for example, we are producing carpets with lighter face weights (less pile) and better durability. The embodied energy not used in the nylon not consumed is enough to power the entire factory making the redesigned products—twice.

Those technologies of the future will enable us to operate without emitting anything into the air or water that hurts the ecosystem. We're just beginning to understand how incredibly difficult this will be because the materials coming into our factories from our suppliers are replete with substances that never should have been taken from Earth's crust in the first place.

To complement and reinforce new technologies, we will continue to sensitize and engage all 7,000 of our people in a common purpose to do the thousands of little things—the environmentally sensitive things, energy saved here, pollution avoided there—that collectively are just as important as the five big things, those technologies of the future: solar energy, closed-loop recycling, zero waste, harmless emissions and resource-efficient transportation.

Finally, I believe we must redesign commerce in the next industrial revolution and redesign our role as manufacturers and suppliers of products and services.

Already, we are acquiring or forming alliances with the dealers and contractors that install and maintain our products, requiring an investment of some $100 million in the United States alone since 1995. With these moves downstream into distribution, we are preparing to provide cyclical, "cradle-to-cradle" (another term I borrow from Bill McDonough) service to our customers, to be involved with them beyond the life of our products, into the next product reincarnation, and the next. The distribution system will, through reverse logistics, become as well a collection and recycling system, keeping those precious molecules moving through successive product life cycles.

In our reinvented commercial system, carpet need not be bought or sold
at all. Leasing carpet, rather than selling it, and being responsible for it cradle-to-cradle, is the future and the better way. Toward this end, we’ve created and offered to the market the Evergreen Lease, the perpetual lease for carpet. We sell the services of the carpet: color, design, texture, warmth, acoustics, comfort under foot, cleanliness and improved indoor-air quality, but not the carpet itself. The customer pays by the month for these services. In this way we make carpet into what Michael Braungart, a German chemist and associate of Bill McDonough in McDonough Braungart Design Chemistry, terms a “product of service,” what Paul Hawken described as “licensing” in The Ecology of Commerce, and what the President’s Council on Sustainable Development calls “extended product responsibility.”

Environmental sustainability, redefined for our purpose as taking nothing from the Earth that is not renewable and doing no harm to the biosphere, is ambitious; it is a mountain to climb, but we’ve begun the climb.

Each of the seven broad initiatives we’ve undertaken—the five areas of new technologies, sensitized people, and reinvented commerce—is a face of that mountain. Teams all through our company in manufacturing locations on four continents are working together on hundreds of projects and technologies that are taking us up those seven faces toward sustainability. We know we are on just the lowest slopes, but we believe we have found the direction that leads upward.

We’ve embraced The Natural Step, the frame of reference conceived by Dr. Karl-Henrik Robert of Sweden to define the system conditions of ecological sustainability. In the thousands of little things, The Natural Step is helping provide what we have termed the “sensitivity hook-up” among our people, our communities, our customers and our suppliers. We want to sensitize all our constituencies to Earth’s needs and to what sustainability truly means to all of us.

We started this whole effort in our company on two fronts: the first was focused on waste reduction. That’s the revolution we call QUEST. We define waste as any cost that goes into our product that does not produce value for our customers. Value, of course, embraces product quality, and more: aesthetics, utility, durability, resource efficiency. Since any waste is bad in pursuit of maximum value, we’re measuring progress against a zero-based waste goal.

A revolutionary notion itself, our definition of waste includes not just off-quality and scrap (the traditional notion of waste); it also means anything else we don’t do right the first time—a misdirected shipment, a mispriced invoice, a bad debt and so forth. In QUEST there is no such thing as “standard” waste or “allowable” off-quality. QUEST is measured in hard dollars and, as I said, we’ve taken 40 percent, or $67 million, out of our costs in three-and-a-half years, on our way to a rate of more than $40 million per year of waste reduction by the end of 1998, and that much or more again when we actually get to zero waste.

One quick result: scrap to the landfills from our factories is down more than 60 percent since the beginning of QUEST in 1995; in some factories, 80 percent.

We’ve also begun to realize that it might even be possible to take waste, by its current definition, below zero as measured against our 1994 benchmark. If we substitute one form of energy (solar) for another (fossil), or one form of material (recycled) for another (virgin), we are making systemic changes that create, in effect, negative waste when measured against the old norms.

To give this new meaning to everyday activities, we have further
changed our definition of waste in one category and declared all energy derived from fossil fuels to be waste, waste to be eliminated systematically, first through efficiency improvement, then by renewable energy. Even the irreducible minimum of energy needed to drive our processes is waste by this definition, as long as it comes from non-renewable sources.

The second parallel effort, termed EcoSense, is focused on those other four major technologies of the future, together with the thousands of little things and the redesign of commerce. Measurement is more difficult for EcoSense. We’re dealing here with “God’s currency,” not dollars, guilders or pounds sterling—the field called EcoMetrics, a term I coined. Here’s an example of EcoMetrics: How do you evaluate the following hypothetical trade-off? One product consumes 10 pounds (per unit) of petrochemically derived material, a non-renewable resource. Another, functionally and aesthetically identical to the first, consumes only six pounds, substituting four pounds of abundant, benign, inorganic material, but through the addition of a chlorinated paraffin. That chlorine could be the precursor of a deadly dioxin. How does one judge the true cost or value (which is it?) of that chlorinated paraffin—in God’s currency?

That’s EcoMetrics, the search for God’s currency.

It’s perplexing—a scale that weighs such diverse factors as toxic waste, dioxin potential, aquifer depletion, carbon-dioxide emissions, habitat destruction, non-renewable resource depletion and embodied energy. EcoMetrics: We need God’s own yardstick and wisdom to help us measure where we are, which direction we’re headed, and to tell us when we reach sustainability. Dollars and cents alone won’t tell us.

In February 1996, we brought together these two revolutionary efforts, QUEST (the hard dollar effort) and EcoSense (the “God’s currency” effort, measured by EcoMetrics). We merged the two task forces into one, and formed 18 teams with representatives from all of our businesses worldwide, each team with an assigned scope of investigation.

It was a wonderful marriage. It is integrating these closely related efforts and positively changing our corporate culture because it is making us think differently about who we are and what we do. As my associate, Dr. Mike Bertolucci, says, “It is as if you enter every room through a different door from the usual one, so different is the perspective from which you view every opportunity.” I call it “piercing the veil” and finding on the other side a whole new world of opportunity and challenges.

Today, there are more than 400 projects, from persuading our landlord to install compact fluorescent light bulbs in our corporate headquarters office, to creating new, sustainable businesses within our company.

Other companies, different from ours, will have to pursue different technologies, different from ours. In the next industrial revolution, I believe they must if they expect to survive. In the 21st century, as the revolution gathers speed, I believe the winners will be the resource-efficient. At whose expense will they win? At the expense of the resource-inefficient. Technology at its best, emulating nature, will eliminate the inefficient adapters.

Meanwhile, the argument goes on between technophiles and technophobes, one saying technology will save us, the other saying technology is the enemy. I believe the next industrial revolution will reconcile these opposing points of view, because there is another way to express the differences between the first industrial revolution and the next. The well known environmental impact equation, popularized by Paul and Anne Ehrlich in their writings, declares that:

\[ I = P \times A \times T \]

In the equation, I is environmental impact (bigger is worse), P is population, A is affluence, and T is technology. An increase in P, A, or T results in a greater (worse) environmental impact. Technology is part of the problem, the technophobes’ position. But
that is the technology of the first industrial revolution, call it T1. Now the equation reads:

\[ I = P \times AxT1 \]

What a dilemma! T1 is not the answer. T1 will not lead us out of the environmental mess, no matter how vigorously the technophiles assert it will. The more technology we have, the greater (worse) the impact.

But just what are the characteristics of T1, the technologies of the first industrial revolution? For the most part, they are extractive (written right into the dictionary definition of technology), linear (take-make-waste), fossil fuel-driven, focused on labor productivity (more production per worker), abusive, and wasteful—the destructive, voracious, consuming technologies of the first industrial revolution. And they are unsustainable.

But what if the characteristics of T were changed? Call it T2 now, the technologies of the next industrial revolution. Let's say they were renewable, rather than extractive; cyclical (cradle-to-cradle), rather than linear; solar- or hydrogen-driven, rather than fossil fuel-driven; focused on resource productivity, rather than labor productivity; and benign in their effects on the biosphere, rather than abusive. And what if they emulated nature, where there is no waste?

Mightn't it then be possible to restate the environmental impact equation as:

\[ I = \frac{P}{\text{T2}} \]

Then the technophiles, the technophobes, the industrialists and the environmentalists could be aligned and allied in their efforts to reinvent industry and civilization. Move T from the numerator to the denominator and we change the world as we have known it. The mathematically minded see it immediately.

Now, the more technology the better (less impact). Furthermore, it begins to put the billion unemployed people of Earth to work—working on increasing resource productivity, using an abundant resource, labor, to conserve diminishing natural resources. Technology becomes the friend of labor, not its enemy. Technology becomes part of the solution rather than part of the problem. Again, I credit Bill McDonough for a magnificent insight: T must move to the denominator.

What will drive technology from the numerator to the denominator? I believe getting the prices right is the biggest part of the answer; that means tax shifts and, perhaps, new financial instruments such as tradable emission credits, to make pollution cost the polluter—in effect, a carbon tax.

In any event, it means eliminating the perverse incentives and getting the incentives right for innovation, correcting and redressing the market's fundamental dishonesty in externalizing societal costs, and harnessing honest, free-market forces.

"But what in turn will drive the creation of tax shifts and other politically derived financial instruments? It seems to me that those will ultimately be driven by a public with a high sense of ethics, morality, a deep-seated love of Earth and a longing for harmony with nature."
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Walter H. Jamison spent only one day on the Georgia Tech campus and received a master’s degree. Welcome to the world of distance-learning.

The option of taking courses or earning an advanced degree through various forms of long-distance communication has long been a fixture at Georgia Tech. But the means of delivering that instruction is about to take a technological leap forward that could profoundly enhance the quality of distance learning, and perhaps even redefine education.

In August, Tech will add an online master’s degree in mechanical engineering to its stable of distance-learning offerings. The lectures will not be viewed on television, as Jamison did with videotape, nor by satellite transmission. Instead, students will view the lectures on their desktop computers, delivered over the Internet.

Distance learning is offered by hundreds, if not thousands, of colleges and universities around the world, along with a rapidly growing number of corporate and private entities devoted exclusively to distance learning. Though a great majority of these organizations offer courses through the Internet, with a handful of exceptions these online courses consist only of access to the lecture notes.

What distinguishes Georgia Tech’s offering is its use of streaming video and audio, essentially to transmit an image of the professor delivering the lectures, something like movies on demand. The lecture notes being used by the instructor also appear on the screen.

Tech also expects to soon add masters’ programs in electrical engineering and environmental engineering to its Internet-based offerings. In the fall, even some undergraduate programs in engineering will be delivered via the Internet in an innovative course-sharing collaboration with other Georgia universities.

“It’s taking advantage of modern technology to make our programs available,” says Dr. Ward Winer, chairman of the Woodruff School of Mechanical Engineering and holder of the Eugene C. Gwaltney Jr. Chair in manufacturing. “I see it as extending the reach of Georgia Tech’s mechanical engineering program literally around the world. I see the Internet program supplementing not only our existing program on
Dr. Ward Winer, chairman of the Woodruff School of Mechanical Engineering: Use of the Internet for teaching extends "the reach of Georgia Tech's mechanical engineering program literally around the world. It supplements not only our existing program on campus, but also our video program and our Georgia Tech-Lorraine program. We would have a cafeteria listing of delivery methods available to students."
campus, but also our video program and our Georgia Tech-Lorraine program. We would have a sort of cafeteria listing of delivery methods available to students."

The trend in distance learning is moving from media-based instruction to online instruction at the desktop, according to Dr. Joseph S. DiGregorio, vice provost for Distance Learning, Continuing Education and Outreach at Georgia Tech.

"We think the long-term future for us will be predominately delivering online programs," he says.

"We want to become a national leader in distance learning. Our videotape program is extremely well-known, extremely well-recognized. Ten or 20 years from now people are going to say Georgia Tech was one of the pioneers and leaders in developing high-quality online learning."

**Second-Generation Delivery System**

Since 1977, videotaped lectures have served as the backbone of Tech's distance-learning program, which provides students off-campus the opportunity to earn certain graduate engineering degrees or take individual courses for professional development. The tapes are shipped or mailed to students, who watch the lectures at home, take tests, and communicate with their professors by telephone, fax or e-mail.

In addition, professional-development classes may be delivered to a group at a business or other off-site location via satellite or videoconferencing.

The advent of instruction delivery by Internet represents an extension of those technologies, rather than a replacement, DiGregorio says.

"We're not going to do away with the videotape or satellite. We believe they will continue to be primary parts of our program in the future. In fact, we're expanding our videotape program because the demand is so great. What will happen, though, is these point-of-origin technologies are going to converge at the desktop. The lecture's point of origin—videotape, satellite signal, videoconference—will be transparent."

Dr. Joseph Boland, director of the Center for Distance Learning at Tech, explains the "transparency" of an Internet-based system as analogous to a telephone call.

"When you call a friend in California, you don't know whether the signal is going over twisted pair, fiber or satellite. The process is transparent to you, but the signal gets there. We hope that at some point in the future, we will be sending distance-learning courses over the Internet just as reliably."

Internet-based instruction holds the promise of expanding the attributes that already attract students to Georgia Tech's distance-learning program: accessibility, convenience and quality. Jamison's circumstances are typical. He's a radiographer and radiation-safety chief at Lockheed-Martin's facility at the Naval Submarine Base at Bangor, Wash. Since his job poses many health-physics problems, he wanted to obtain a master's degree in that area. His undergraduate degree in electrical engineering was earned at Texas A&M.

"It's a really long commute from where we are to the University of Washington," he says. "With the kind of hours I work, I would not have been able to do that at all, so I was looking for an alternative."

He mentioned his search to a visiting health physicist, who recommended the distance-learning program at Georgia Tech.

Jamison took a course each quarter except for one, an "absolute hell" when he squeezed two courses into the 13-week period. "I don't think I did anything but watch tapes," he says.

That quarter notwithstanding, Jamison gives the distance-learning program high marks.

"I was somewhat hesitant at first because I'd taken a correspondence course or two and never had anyone I could talk to—I just got materials that were sent back and forth. Georgia Tech was absolutely wonderful. The professors would spend all kinds of time on the phone. They'd answer all kinds of questions, and I faxed stuff back and forth. It was really a very good learning experience."

**Time Pressures**

Internet delivery may eliminate the lag time between the actual class and the off-site student using videotape. But the difference didn't seem to bother Jamison.

"You follow along two weeks behind the class on campus," he explains. "Your assignments have to be done exactly two weeks after they're due on campus, and your exams are exactly two weeks after the exam on campus. So there is time pressure, a kind of spur to keep you moving, unlike correspondence courses where you tend to put everything off to the end of the quarter and then try to do it all at once."

Perhaps the greatest benefit to nontraditional students, who constitute the overwhelming majority of distance learners, is the program's flexibility, which would be preserved if not enhanced by Internet delivery.

"If I finished a really bad day at work, I could come home, look at the tape, and say, 'Eh, not tonight. I'll do it tomorrow.' It allowed me to..."
Dr. Joseph S. DiGregorio, vice provost for Distance Learning, Continuing Education and Outreach: “We think the long-term future for us will be predominately delivering online programs. We want to become a national leader in distance learning. Ten or 20 years from now, people are going to say Georgia Tech was one of the pioneers in developing high-quality online learning.”
adjust my schedule to take care of the school work rather than have my schedule driven by the school.”

Another factor driving instruction delivery to the Internet is the effort to reach the sharply increasing number of potential students—working men and women who are discovering that continuing education is a prerequisite for career advancement.

“Distance learning can be very attractive to nontraditional students—those who are working and need to retrain themselves or want to expand their knowledge through new degrees or programs,” says Dr. Jean-Lou Chameau, dean of Engineering. “The advantage of Internet delivery is that people have access to it almost any time. They can study a lecture today and do it again tomorrow or almost any time.”

“In engineering, as in many other professions, the life of a bachelor’s degree is five years, maybe even less in some disciplines,” Boland adds. “It’s no longer an option for a person to get a degree and go off and work for 40 years without continuing their education. We’re trying to provide that education opportunity to them at their work site or at home. Students like it because they don’t have to move or disrupt their jobs. Companies like it because they don’t have to give up that person’s productivity, and at the end they have a better-prepared employee.”

New Learning Capabilities

Internet delivery brings other new learning capabilities not found in standard distance-learning technologies. Student interaction with one another, lacking in videotape-based instruction, could be facilitated with so-called electronic “chat rooms” or e-mail. Electronic links could direct students to additional resources such as a library or database that will help illuminate the material. The medium is also ideal for presenting simulations or annotations to accompany the lectures.

In addition, the Internet technology applied to distance learning has found its way into the classroom. Professors already use the medium to communicate homework assignments, grades, office hours and similar information. The Internet could become the electronic equivalent of a textbook or workbook, as it already is for many students, with certain assignments to be completed online.

No Virtual for Reality Campus

No matter how sophisticated the program, the consensus is that a virtual classroom won’t replace the old-fashioned way of getting a Georgia Tech education.

“We don’t see distance learning replacing the campus,” DiGregorio says. “For the foreseeable future, students are going to want to come to Georgia Tech. What we do see, though, is adult working professionals and students who can’t come to Atlanta for whatever reason—financial, family, personal situations—will be able to access the very high-quality programs that Georgia Tech produces via distance learning.”

Ward Winer agrees. “The best way to get an education is to sit in a classroom with a faculty member and talk things over eye-to-eye,” he says. “But a lot of students can’t do that for one reason or another, and by developing these distance-learning programs, via both videotape and the Internet, we’re able to service those students with a very high-quality program.”

The opportunity presented by Internet-based distance learning could bring substantial benefit to Georgia Tech as well, and it is a cornerstone of the Institute’s strategic plan for the next century.

That plan envisions a total enrollment of 20,000 students by the year 2010. Three-fourths of that number are expected to be on-campus, an increase of only about 1,000 students from this year. The remaining 5,000 new Yellow Jackets are expected to be earning degrees in the distance-learning program, an order-of-magnitude increase over the current level of 450.

“You might need more faculty and more faculty space, but you won’t need more classroom space or dormitories,” says DiGregorio. “In the long run, this becomes a less-expensive way to increase enrollment, though initially it’s very expensive to produce distance-learning programs.”

Desktop Distance Learning

The University System of Georgia’s desktop distance-learning network will carry Tech’s new Internet-based master’s program in mechanical engineering and other degree programs in the future.

“Eventually, the University System’s desktop distance-learning network will involve all 34 schools in the University System of Georgia, offering courses, certificates and degrees online,” DiGregorio says. “Anybody in the state will be able to take courses from any school in the system at their desktop, either at home or in the office. That’s the goal.”

To that end, University System Chancellor Stephen Portch has appointed a statewide committee—DiGregorio is a member—to develop the concept and make recommendations on the formation of a “virtual university” in the state. Tentatively called the Georgia Educational Alliance, the
The New Chalkboard

Taking advantage of technology may benefit different learning styles

It's like giving a violin to a gorilla. That's one way Dr. Tom Barnwell characterizes using the Internet as strictly a lecture-delivery medium.

A professor in the School of Electrical and Computer Engineering, Barnwell chairs a 25-member Task Force on Computer-Enhanced Education. The group is restructuring the school's core curriculum for delivery over the 'Net.

A pilot program is set to take off in the fall, when undergraduate engineering courses will be electronically accessible to students at Georgia Southern, Armstrong State and Savannah State. The Georgia Tech Regional Engineering Program, as it's called, is intended to become a model of distance learning, institutional cooperation and course sharing throughout the University System of Georgia. The program is expected to be in full swing by fall 2000, Barnwell says.

Remote delivery of instructional material and course work via the Internet—to residence halls and throughout the Georgia Tech community as well as to more distant locations—is but one aspect of the task force's work. The faculty panel is also grappling with the fundamental question of how best to exploit the technology's definitive qualities to enhance teaching effectiveness.

The first step in developing the Internet as an educational tool is simply to record lectures in some fashion and upload the media files to the World Wide Web, says Barnwell. "That's not much different from traditional video technology; it's just supported by a different communication capability."

To realize the potential of online technology requires an innovative rethinking of ways information can be presented, and more importantly, how that information is absorbed by students, Barnwell says. He believes the real value of the Internet as an instructional mode is that it provides new tools to accommodate different learning styles.

"Traditional technology was a blackboard and a piece of chalk," he explains. "There's a percentage of students who respond very strongly to that kind of teaching and learning mode, so they're a good fit. But we've always known there are other students—in many cases very bright students—who don't respond as well to that traditional approach."

Barnwell notes that some engineering students prefer to jump right into a problem, and if they can't solve it after a while, find the solution in the back of the textbook and figure out the steps in between. Others would rather learn the particular mathematical principles underpinning a particular set of problems before attempting solutions. Of the latter group, Barnwell says visualization tools readily accommodated by online technology can contribute to the learning process.

"Mathematical concepts are not always easy to grasp," he says. "Going from the theoretical to the physical can be a pretty good jump, and computer graphics helps a lot."

So, while the evolution of Internet-based courses will likely retain lectures and problem-solving, Barnwell envisions the information as accessible from the desktop and redundant in different formats—text, graphics, sound, animation and real-time online interaction. Rather than wade through everything, a student could choose and follow the particular format that suits his or her learning style.

"The Internet is driving pedagogical changes," Barnwell says. "It can change the way we deliver education, and also improve the quality of what we deliver." —Gary Goettling

system would centrally coordinate electronic delivery of each school's courses and degrees, utilizing both the distance-learning infrastructure in place and the online capabilities of the statewide system.

Another step in that direction is contained in a new pilot program called the Georgia Tech Regional Engineering Program. A potential model for education delivery in the state, the program will provide undergraduate engineering courses originating at Tech and transmitted to students at Georgia Southern, Armstrong State and Savannah State. Each of the other institutions will contribute their own specialized courses, and students will move electronically among the four as necessary to complete their degrees.

Distance learning is attracting a lot of attention among other public-education officials in states across the United States. They are no doubt impressed by the example of the University of Phoenix which—despite its public-sounding name—is a private, for-profit institution. Widely known in academic circles as one of the first and most aggressive purveyors of distance learning, the university claims a half-million students from all over the world have availed themselves of its programs over the past 20 years.

In an effort to corral their share of the distance-
learning market, a number of states, notably Michigan and California, have established “virtual universities” out of distance-learning courses made available through their member institutions.

A regional approach is followed by Western Governors University. A 3-year-old collaboration of colleges and universities in 13 western states, the university grants degrees under its own name and is devoted exclusively to distance-learning education. Corporations, which foot the bill for more than 90 percent of the continuing education and professional development schooling in the United States, play a prominent role in curriculum development.

**Impact on Education**

The proliferation of universities and other organizations offering distance learning portends some interesting implications for education itself. By eliminating the constraints of location, distance-learning technology is giving students access to advanced education worldwide. Just about every subject imaginable is or will be offered by someone somewhere. As more learning is delivered online, that access becomes equalized, creating a single, global marketplace for education of all kinds.

But while distance learning is offered by the most highly regarded colleges and universities—it's even offered by venerable Oxford University in England—its purveyors also include a large number of significantly less renowned institutions, to put it mildly. That raises serious concerns about education quality and the integrity of a university degree.

In part to mitigate those concerns, the Southern Regional Electronic Campus (SREC) was created in 1998. Membership comprises more than 50 institutions, including Georgia Tech, from 15 southern states. Rather than offering classes or degrees itself, SREC serves as a clearinghouse for information about programs offered at a distance by its members. Students may view course descriptions and find out how they are delivered. Links to the separate institutions are provided for details regarding admissions, registration, cost and so forth.

Each SREC member must be accredited in its home state, and its distance-learning courses must meet a common standard of quality called the Principles of Good Practice, developed by the SREC.

Quality is paramount to Georgia Tech officials. By the very nature of online distance learning, one program is as accessible as any other program. What will differentiate Tech and provide a competitive edge is the technology, and the Institute's
Dr. Joseph Boland, director of the Center for Distance Learning: "Tech doesn't intend to change its goal and mission. But we also believe there's a large market in the United States and internationally for the kind of rigorous, quality education that Georgia Tech offers."
strong tradition in education.

"By producing quality courses and degrees with the right technologies, by having strong faculty involvement and academic control of the curriculum, Georgia Tech will be recognized as having the best distance-learning programs available anywhere in the world," DiGregorio says.

"Tech doesn't intend to change its goal and mission," Boland adds. "We're still going to be serving the upper-end student with the same requirements for admission and degree completion as our campus-based students. That's our niche, and we plan to stay with that. But we also believe there's a large market in the United States and internationally for the kind of rigorous, quality education that Georgia Tech offers." GT

**Toddling Technology**

Tech begins experiments with public-offering short courses at distant locations

The first tentative steps toward a virtual classroom are meticulously taking shape in room 310 of Georgia Tech's Administration Building.

Inside, Dale Atkins tends to his Internet-based demonstration of several public-offering short courses. Encoded at 28.8K bps, the audio sounds fine, though the video portion could be smoother, a little less like a World War I film clip.

But it's a start.

As director of Continuing Engineering Education at Georgia Tech, Atkins' job is developing the enormously successful public-offering short courses available through the Department of Continuing Education.

As such, he's something of an entrepreneur on campus.

“We offer courses that are meant to make money, or at least break even,” he says. “When we make money, we use it to develop other courses.”

The continuing-education courses, which cover topics from asbestos abatement to Web design and programming, provide in-depth, practical information geared to business and industry. Atkins is focusing on Internet delivery of courses under the logistics banner first because they represent some of the most popular offerings, and he is most familiar with the content.

The information, encoded in streaming video, is typically presented by a mix of speakers, including vendors, consultants, industry leaders and Georgia Tech professors. With as much as 30 hours of total "face time," time devoted to lectures, the courses squeeze nearly a quarter's worth of information into a week-long program.

Popular as they are—the logistics courses alone have attracted about 5,000 enrollments over the past couple of years—he realizes the content-rich series could better accommodate customers' needs if it were available at other locations besides Georgia Tech.

“When you go through one of these courses, you have only one chance to get it,” he says. “You either hear it when you’re there, or you don’t.

“What I’m trying to do is take existing courses, not modify them a lot, and put them up on the Web so people with a minimum 28.8 modem can see them any place, any time.”

So that the instruction generates revenue, Atkins would like to devise some sort of pay-per-view setup for the Web-based offerings, or better yet, a site-license arrangement where the company would carry the courses on its intranet for a fixed period of time.

The availability of public-offering short courses at distant locations would increase the market for such programs to an unprecedented global level. Siemens and Lucent Technologies have already expressed interest in the intranet idea, and Atkins says strong potential markets exist in Europe, and Central and South America.

“One of the big benefits of Internet delivery is that it allows us to broaden our audience and bring these courses to people who aren't able to come to Georgia Tech for whatever reason,” he says.

Atkins admits his online demo isn't technically exotic, but “it doesn't need all the bells and whistles to be functional.” He would like to add a measure of interactivity to the model, though, before releasing a full-fledged version to the Web.

“Of course, it would be nice to see how much their people are learning. We don’t do that now.”

The way Atkins sees it, Internet delivery of public-offering short courses also burnishes Tech's already-shining reputation in that area of continuing education.

“We have a huge following for these courses, so we have to make sure that we don’t just ride on our reputation; we build on it,” he says.

“The content quality of the Internet courses has to be at least as good—and probably better—as the quality of the courses held in the classroom.” —Gary Gocttling.

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Range Rovers

Western Jeep excursion gives tourists a ride on the wild side

By Shawn Jenkins
Photography by Gary Meek

It's early morning at the Scottsdale, Ariz., home of Heather and Rick Peacock, as their cowboys begin checking in. "Crash" Marusich, a colorful throwback dressed head-to-toe in 1880s-era clothing, grabs his morning coffee as he scans the day's docket. "I'm taking the senator out today," he reminds Heather as he checks the time on an ornate pocket watch he pulls from his embroidered silk vest.

"Don't take him down too rough a trail," Heather jokes.

Marusich grins wide, straps on his holster and slides his "fifth ace"—a foot-long decorative knife and saloon gambler's best friend—into his boot as he ambles toward the door. "Hmm. Maybe I should leave the gun here," he
Equal parts eco-tour, archeology lesson, shooting gallery and roller-coaster ride, Wild West Jeep Tours introduces its “clients” to the rugged beauty of the Sonoran Desert, a region that encompasses the lower half of Arizona and spills into portions of New Mexico, California and Mexico.
W
ot your usual office water-cooler banter for Heather Peacock (McKinney), IM ’83, who, along with husband, Rick, owns and operates a modern-day version of a stagecoach ride known as Wild West Jeep Tours.

Enlisting the services of gun-toting tour guides—renaissance men and women who know the outdoors like the back of their riding gloves—the couple has catered to adventurous souls since 1983. Equal parts ecotour, archeology lesson, shooting gallery and roller-coaster ride, Wild West Jeep Tours introduces them to the rugged beauty of the Sonoran Desert, a region that encompasses the lower half of Arizona, spills into a portion of New Mexico and California, and extends almost all the way down the Baja Peninsula into Mexico.

With referrals from resort concierges and meeting planners, the company conducts tours seven days a week year-round in the dry and perpetually sunny Scottsdale area, offering an alternative to the tourist traps and a chance to experience the wide-open spaces—just as Heather did in her youth.

"Ever since I was a little girl, my parents would take us camping," Peacock says. "They were educators, and they thought it was important to travel. We started going to Wyoming for the summers, and that’s where I got my love for Wyoming. I just loved the outdoor lifestyle that people have—the focus on enjoying God’s creation versus shopping at the mall."

Peacock further cultivated her love of the outdoors by participating in Georgia Tech’s O.R.G.T. (Outdoor Recreation Georgia Tech).

"Backpacking with O.R.G.T.,” she says, "was just an extension of my love for the outdoors. It’s such a neat program, and some of the friends I met then are still friends.

"One of the most memorable trips we did was over New Year’s. We went to Cumberland Island and did a five-day backpacking trip. On New Year’s Eve it was pouring down rain, and we all huddled in the tents and played cards. Somebody even broke out a bottle of champagne they had stashed in their backpack."

While working toward her degree at Tech, Heather would spend her summers back in Wyoming, working for the Grand Teton Lodge Co. in Jackson Hole. There she met business partner and future husband, Rick Peacock, who worked as a boatman running trips on the Snake River.

With two Jeep Scramblers and a legally binding 50-50 partnership—"my parents suggested we handle it that way since we weren’t sure where the relationship was going," Heather says—Wild West Jeep Tours began shuttling passengers through the Bridger-Teton National Forest in Wyoming, the largest in the lower 48 states. They later expanded the business to Rick’s hometown of Scottsdale, where they could continue to offer tours after the Tetons turned too cold for comfort.

"The crux of the Wyoming tour is the gorgeous scenery of the Tetons and the wildlife biology," Peacock says. "People are fascinated with the big-game animals. They can see bison, moose, antelope, mule deer, elk, all on one tour. In Arizona we bill the guides as naturalists in the way they conduct the tour, giving flora, fauna, botany, history—a little bit of everything. In Wyoming, we’re more like wildlife biologists."

Their home serves as the company’s corporate office and their backyard as a staging area and triage for 12 Jeeps that are in constant need of pampering. Rick Peacock, a former Jeep racer familiar with the attrition of desert vehicles, serves as the official pit crew for the fleet of four-wheelers, customizing them for safety and durability and keeping them on the "road."

The Arizona tour site is on a private section of the Tonto National Forest—the second-largest national park in the contiguous United States—called the Spur Cross Ranch.

"We have an arrangement, a landlord-lessee situation, where we pay a per-head fee to the owners to go into the area," Heather says. "This land, which is 2,400 acres, is a private ranch-holding, owned by an insurance company in Ohio and some private local investors. It has spectacular Indian ruins, which are not the only ones out there, but they’re some of the best."

Evidence of Spur Cross’s prehistoric inhabitants, an unknown tribe the Pima Indians call “ho-ho-kam,” meaning "they’re all gone," can be seen in rock carvings called petroglyphs. They depict ancient warriors hunting a herd of large, horned animals—likely elk or antelope—with bow and arrow.

The Sonoran Desert flora present a pharmaceutical resource second only to the Amazon basin. Plentiful are Hedgehog cactus—superior to aloe in its burn-healing capacity; Mormon Tea—a natural source of *ephedra* (a headache remedy); and jojoba bean—an appetite suppressant and source of pure oil.
Evidence of Spur Cross's prehistoric inhabitants, an unknown tribe the Pima Indians call "ho-ho-kam"—meaning they're all gone—can be seen in petroglyphs. "The Indian ruins are not the only ones out there, but they're some of the best." They depict ancient warriors hunting a herd of large, horned animals—likely elk or antelope—with bow and arrow.
In addition to its trademark Saguaro cactus, a towering sentinel found nowhere else in the world, the Sonoran Desert is home to numerous other prickly plant life, like the *ocotillo*, which resembles an exploding party favor. One spiny menace—"jumping cholla" (pronounced "choy-ya")—earned its name for its ability to cling to virtually anything from out of nowhere. Tour guides affectionately refer to it as "Velcro with an attitude," demonstrating its tenacity by flinging a piece onto their Jeep tires where it sticks like a dart.

Wildlife abounds as is evidenced by the many yield signs denoting crossings for snake, quail, roadrunner and javelina—a small desert pig—on the roads approaching Spur Cross.

With a number of its creatures being poisonous—rattlesnakes, scorpions, tarantulas—and partial to cool, shaded areas, Wild West Jeep Tour guides warn curious tourists against probing the desert rocks where they may disturb the anti-social inhabitants.

"All of the rattlers out here are union," quips Marusich. "You don't bother them, they won't strike."

"Ever since I was a little girl, my parents would take us camping," Peacock says. "They were educators, and they thought it was important to travel."
The Jeep ride itself is a bone-jarring proposition, much of it bouncing precariously along the rim of Spur Cross ravines.

"Crash," an eight-year veteran of the company known for his attention to historical detail—he was a summa cum laude history graduate at nearby Arizona State University—explains that "this is usually the point where passengers begin asking me about my nickname."

"Me and the Desert Mother have an understanding," he reassures them. "I respect her, and she doesn't kill me."

Respect is what Heather Peacock hopes will stay with her clients long after adventure has worn off: respect for the land, for the lore, for its native peoples and its wildlife.

Unfortunately, the private owner of her tour's site has other plans.

"All along we've known that they were interested in developing it," Heather says. "They've planned a resort, 150 home sites, a convenience store, golf course. There's a huge outcry from the whole Phoenix area because people know that that's one of the last local riparian areas—streamside or riverside areas—in this region; it's just lush with indigenous plants and animals. We've worked closely with the Hopi Indian tribe and the Spur Cross preservation group to see what kind of solutions we can offer."

Currently, the state of Arizona is considering pur-
chasing the land and turning it into a state park or preserve. Barring that, the area will likely go the way of what is now incorporated Scottsdale.

"This all used to be part of the desert," Peacock points out as she drives through the city's encroaching environs. "They paved paradise to put up a parking lot." GT

Last ride for a modern-day posse? Spur Cross Ranch is slated for development unless the state buys the land for an Arizona Preserve.
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Anatomy of a Hesburgh Award

By Dave McGill

In February Georgia Tech received the Theodore M. Hesburgh Award, the most prestigious award for teaching given an American institution of higher education. The award was presented to Tech President Wayne Clough and Dr. David J. McGill, director of the Center for the Enhancement of Teaching and Learning. Here is Dr. McGill's report on Tech's quest for the Hesburgh.

Monday, Feb. 15, was the kind of winter day that lures Washington natives outside and surprises visitors to the nation's capital—cold but sunny, with no wind. But despite the beautiful weather, my thoughts were on what was happening indoors.

At the annual luncheon meeting of the American Council on Education, Georgia Tech President Wayne Clough was accepting the Theodore M. Hesburgh Award—the highest honor an institution of higher learning can receive for its teaching prowess—from John Biggs, chairman and CEO of the Teachers Insurance and Annuity Association/College Retirement Equities Fund (TIAA-CREF). The luncheon was attended by 1,200 educators in the ballroom of the Grand Hyatt Hotel.

Dr. Clough gave a gracious acceptance speech before the 1,200 educators gathered in the hotel's ballroom, followed by an entertaining address by Elizabeth Dole, who has held two Cabinet posts and was president of the American Red Cross. I watched the event in the company of Tech's first lady, Anne Clough, and John "Chip" Ackeridge, a Tech alumnus who lives in Washington.

I was invited along for the ride because I had the pleasure of researching and writing Tech's nomination for the award last summer.

Following the luncheon, Tech and the three schools receiving Certificates of Excellence (honorable mentions) discussed our various programs and posed for pictures. The other schools were the University of Delaware, College of the Canyons in California and the University at Stony Brook in New York. Eight Tech graduates who live in the D.C. area joined in the celebration, along with Dr. Linda Brady, chairwoman of the School of International Affairs, who was in town for the ACE meeting.

News of the award had reached us in late December, a Christmas present of sorts that delighted Tech's top administrators. I practically ran to the office of my boss, Provost Mike Thomas, and blurted out, "We won the Hesburgh Award!" He had been anxious to hear, having signed off on the nomination, and was ecstatic.

"Have you told Wayne?" he asked. Almost before I had time to answer in the negative, he was towing me across the Carnegie Building lobby toward the president's office. As we barged in, Mike's words were the same as mine had been, except with a couple more exclamation points.

Dr. Clough's response was memorable. As if startled, he tossed his pen way up into the air—it nearly reached the ceiling—and exclaimed, "Are you kidding me?" Then he caught the pen, not missing a beat, as he rose to shake hands all around. "This is a great Christmas present," he said.

 Outstanding Faculty Development

The Theodore M. Hesburgh Award is sponsored by TIAA-CREF and is presented to a university or college every year in recognition of outstanding work in "faculty development to enhance undergraduate teaching and learning." Georgia Tech is the ninth winner of the $30,000 prize. It is given to the faculty development program judged to have best met three award criteria of "significance of the program to higher education; appropriate program rationale; and impact on undergraduate teaching and student learning."

As director of Tech's Center for the Enhancement of Teaching and Learning (CETL), I had been aware of the award for five years, and in the mid-'90s I had often thought it would be wonderful to win it. But the teaching development programs of CETL were young and small back then, while the Hesburgh-winning programs had been in process for years, were all sharply focused on some aspect of teaching, and had made impressive assessments of their progress and successes.

With each year that went by, our own programs grew and flourished. Then last summer, I realized that with my
The CETL staff clockwise from lower right: Dave McGill, Billiee Pendleton-Parker, Melissa Bachman, Cindy Gallion, Christy McFadden and David Shook.
retirement approaching, this would be my last chance to personally nominate Tech for the Hesburgh Award, something I wanted to do. Yet I knew we still needed that certain something that makes a nomination stand out in the eyes of the judges. Suddenly, the answer hit me: It is the alumni support that makes our teaching programs at Tech so special, maybe even unique. So the first thing I wrote for our nomination was its title: "Alumni-Funded Teaching Programs at the Georgia Institute of Technology."

**Alumni-Funded Teaching**

Tech had participated in the Lilly Teaching Fellows Program for the maximum of three years between 1990 and 1992. We were allowed to work with only eight young faculty members on their teaching for an entire academic year (though we snuck in a ninth one in the second and third years). After the Lilly support expired, Dr. Thomas encouraged us to continue the program, with Georgia Tech Foundation interim funding for nine more fellows in 1993, while I sought a sponsor to endow it.

That year, at the provost's request I began a series of presentations to alumni classes that annually select a fundraising project for their 25th, 40th or 50th Homecoming reunion. I struck out that year, but with the encouragement of Dr. Thomas and Christine Betts in External Affairs, I tried again in 1994. That year, I challenged the class of 1969 to support a completely revamped Teaching Fellows program that would support the students *indirectly* by doing something for the faculty *directly*. The class accepted the challenge, and their endowment now stands at $248,100—plus even more in deferred gifts—which today forms the corpus of The Class of 1969 Teaching Fellows Program.

Overhauling the program was absolutely necessary. In our first few years of Teaching Fellows, we were having to say "no" to two or three times as many young faculty as we were able to accept. This seemed to me to be penny-wise and pound-foolish because *all* faculty members who wish to improve their teaching skills should be welcomed and helped to do so. To make it possible to service more of the faculty, we went to a home-grown, six-month program and offered it twice a year. On average, around a dozen fellows have participated in each "class." Since 1990, we have had 165 Teaching Fellows at Tech—close to a quarter of the faculty—and all but 35 have gone through the program in just the past five years.

Other Hesburgh-winning programs in previous years were concerned with topics such as campus-wide teaching-and-learning reform, the scholarship of teaching, a studio-learning format to improve undergraduate education with multimedia, student-centered focus, general education renewal, multicultural education, and freshman retention.

While we touch on most of the above areas in our faculty-development programs, the Teaching Fellows and GTA programs of CETL have an overall focus of making Tech teachers better *communicators*. We buy into the result of a study by Tech Professor Emeritus Ed Loveland, which concluded that what is of the utmost importance to a student at Tech is that teachers prepare well and then present the material to the best of their abilities. To us this means being clear *not only in the content of what they are presenting, but also in the manner in which it is being presented*. At weekly seminars the fellows hear at least eight faculty members who are well known for their teaching discussing what works for them as teachers and communicators.

Other seminars in the program include "Working with Your Graduate Students," "High-Tech Teaching Tools," "Spicing Up Your Classroom" and "The Psychology of Learning." Faculty who have for years given of their time and energy to conduct seminars for the teaching fellows include Charles Eckert, Bonnie Heck, Jim Herod, Bill Black, Larry Jacobs, John Uyemura, Scott Wills, Andy Smith, Jim McClellan, David Frost, Gus Giebelhaus, David Shook and Melissa Bachman.

The systemic problem we are addressing with the Teaching Fellows seminars is that young teachers at Tech typically come on board without any training or experience in teaching, nor any courses in education or pedagogy. As a
result, they are left to sink or swim in their development as teachers. Handed a class roll, a book and some chalk or markers, they are told to “go and teach.” Then, under heavy pressure to write proposals, do research with graduate students and publish journal articles, young professors have very little time to spend developing their teaching skills. It is this gap we try to fill.

In the same quarter the seminars are taking place, CETL Assistant Director Billiee Pendleton-Parker busily visits classes and provides constructive feedback to the teaching fellows about their teaching. This includes what she sees, what the students see, and—via videotape—what the fellows see as they “see ourselves as others see us.” Billiee even provides popcorn for the “screenings.”

In the second quarter of the fellowship, with the guidance of mentors in their field, the fellows implement the teaching projects they had proposed in applying for the program. Most of the projects have had important and lasting impacts on programs in the fellows’ schools. A sampling:

• a student conference on Science, Technology and Race (Kavita Philip, LCC)
• a comparison of web- and paper-based teaching (Amy Pritchett, ISyE)
• a geotechnical test simulator (David Frost, CEE)
• a “Hypercharacters” integrated learning environment for students in Chinese classes (Xiaoliang Li, ML)
• a combination hardware/software tool for power-system analysis (Miroslav Begovic, ECE)

Team Effort for the Nomination

Putting together the Hesburgh nomination package was a team effort at CETL. Dr. David Shook, our coordinator of GTA Programs (and associate professor of Spanish) wrote effectively of how the classes of 1957 and 1972 followed on the success of its “Fellow” class of 1969. For their 40th and 25th reunion fundraising projects, these two classes pledged a total of $540,535 to endow a GTA Resource Center and a group of GTA Development Programs to assist Tech’s graduate teaching assistants. One of these programs is the Academic Intern Program, a series of seminars offered throughout the academic year on the topics:

• Teaching effectiveness and classroom management
• Academic writing
• Professionalism

Dr. Shook not only wrote about the GTA programs, but has been their facilitator ever since he participated with me in obtaining funding from the classes of ’57 and ’72.

Our nomination also contained reference to a pilot project last spring that served our first group of nine “senior teaching fellows.” This program is for mid-career faculty interested in reinvigorating their teaching and in learning new skills while they polish old ones. We plan to use the $30,000 Hesburgh Award money as a basis to try to convince a future Homecoming class to endow the seniors program.

I gave drafts of the nomination package to Drs. Clough, Thomas and Vice Provost Bob McMath. Their collective responses led to my adding an additional section entitled, “New Challenges for the Teacher at Georgia Tech.” That section included data about Tech’s outstanding record with minority students over the past decade, and concluded with the words: “Hence the new teacher at our Institute today is not only faced with the age-old admonition to ‘go and teach,’ but must in fact do so with an eye toward Futurenet, expectations of student computer owners with round-the-clock electronic access to learning and a rapidly changing curriculum. These developments have applied much additional pressure to the faculty and GTAs, and they have accentuated the importance of our alumni-funded teaching programs.”

Besides a 200-word summary and a five-page program...
description, we were also required to demonstrate, with no more than three pages of collateral materials, the program's proven success and impact. For the first page, Pendleton-Parker solicited information from past teaching fellows about awards they have since won.

As the responses filtered in, Christy McFadden arranged them into a database, and from it I was able to present the fact that 42 teaching fellows had won 52 impressive awards in which teaching had played a central role.

The second page featured brief descriptions of 14 fellows' teaching projects. The third page contained photographs of four former teaching fellows and a GTA, along with their testimonies about the alumni-funded programs. Last but not least, administrative assistant Cindy Gallion put the package together, ensuring that we met a set of very strict document requirements.

Final Words

We plan to take advantage of our Hesburgh Award in a number of additional ways. One example is a letter that has been mailed to the families of every high school senior admitted to Tech this year. The letter, encouraging students to join us in the fall, speaks proudly of Tech's emphasis on good teaching as exemplified by the prestigious award.

That's the story of the 1999 Hesburgh Award with but one thing remaining to be said: a heartfelt "thank you" to the Georgia Tech alumni. We have seen a resurgence in respect for good teaching and learning on The Flats in recent years. And every spring, thanks to our alumni, we now celebrate good teaching on "Teaching Fellows Day."
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A lumnus Rudy Bunzl spells retirement w-o-r-k. “Work is my favorite four-letter word,” says Bunzl, ChE ’43, who retired as chief executive officer of American Filtrona Corp. in Richmond, Va., in 1987, and as chairman in 1994.

After retiring, Bunzl moved into a second-floor office suite in a sleek, glass building in a Richmond office park. He goes to work every business day, occupied with his “third” career—the one he didn’t have time for when he had a full-time job.

Bunzl manages the REB Foundation, which he and his wife, Esther, established to support public education. Since 1988, the Foundation has awarded $1.1 million in grants that recognize and support public-school teachers in the city of Richmond and in Chesterfield, Hanover and Henrico counties.

“My third career is the REB Foundation and other civic and community nonprofit work,” Bunzl says. His first career was with Shell Chemical in California, which he began after graduating from Tech, and his second involved moving to Richmond in 1954 to help found American Filtrona Corp., which got its start as U.S. Filter Corp.

Public education faces daunting challenges, Bunzl says, and REB Foundation support is aimed at helping teachers excel at educating kids and preparing them for college.

“Teachers have to make it happen, not politicians,” he says. “What we are trying to do is encourage teachers, motivate them and give them some prestige.”

For the past 11 years, the foundation has donated $100,000 annually for the REB Award for Teaching Excellence. Teachers are nominated for the award by colleagues, students or parents. Last year, 155 teachers from kindergarten through 12th grade were nominated for awards, from which 29 finalists were invited to submit proposals. Awards ranging from $3,500 to $9,400 were presented to 15 teachers whose projects captured the imagination of the 10-judge committee; the other 14 teachers received $500 each for qualifying as finalists.

The awards are financed through REB Foundation, which Bunzl converted from a family foundation to a supporting group of the Community Foundation, a philanthropic organization supporting central Virginia.

Bunzl’s community involvement includes serving as a director of the Richmond Symphony Foundation and the Science Museum of Virginia Foundation. He is on the investment committee of the Sheltering Arms Foundation and a trustee of the World Affairs Council of Greater Richmond, an organization striving to help the city develop an international image.

“I was on the board of the George Marshall Foundation in Lexington, Va., because I’m a great admirer of George Marshall,” Bunzl says of the American general and statesman. “I always kidded them. I think I’m the only GI ever to be on the board of that organization.”

During his business career, Bunzl shunned involvement in civic and community affairs.

“I was very strict,” he says. “I always figured we were all being paid by the stockholders to do a job. I really didn’t do any outside activities before I retired. I think I’ve made up for it since.”

In 1989, Bunzl also took advantage of retirement to pursue a master’s degree in history at the University of Richmond. “History has always been one of my hobbies,” he says. “I finished in ’94. I was probably the oldest person ever to get a master’s degree at the University of Richmond.”

He also received his first computer in 1987 as a retirement present. Ten years later, on his 75th birthday, his wife gave him a new one that enables him to navigate the Internet and correspond by e-mail.

Bunzl removes a slide rule from his desk drawer. “I still use this occasionally to calculate compound interest,” he says slyly. “It never crashes.”

A man of compact stature, Bunzl is physically fit. In his mid-70s, he enjoys skiing, swimming and tennis. The exercise helps keep him in shape, but he participates in sports because he enjoys them. “I’ve never been much of a couch potato.”

Born in Vienna, Austria, Bunzl left his native country for England on June 21, 1938, just before turning 16. The reason, he says, was simple:
"There was a man by the name of Hitler, and I'm Jewish."

After finishing high school in England, he came to Atlanta, where his brother was working, and he entered Georgia Tech.

"My parents said correctly, 'If you take engineering, you can always make a living.' So, I took engineering," Bunzl says. He began in engineering and after his freshman year, decided on chemical engineering.

"I hated mechanical drafting, and chemical engineering was the only engineering course where you didn't have to take the second year of mechanical drafting," he says with a laugh.

"Engineering teaches you how to think," he adds. "Chemical engineering in particular helps teach you to think logically."

"I call myself an engineer gone wrong, because after practicing chemical engineering for 10 years, since I came to Richmond, I haven't done much in chemical engineering," he says.

The REB Foundation has made a $100,000 contribution to Georgia Tech's School of Chemical Engineering.

Bunzl attended Tech during the war years, when the student body numbered about 3,000 and classes were accelerated. He was editor of the *Blueprint*, but because of the war, the yearbook didn't come out until 1944, combining two years into one book. "The *Technique* ran an article calling me the 'Phantom Editor,'" he says cheerfully.

After graduation, Bunzl joined Shell Chemical in California. The company got him a deferment from military service because it made ammonia, used in munitions.

"I worked there 10 months," he says. "I was anxious to get into the service. I tried to get into the Navy, and they wouldn't take me because at the time I wasn't a U.S. citizen yet. I didn't tell Shell when my deferment was running out; I allowed myself to get drafted."

Bunzl served two years in the Army. "I was put through basic training—which was a good experience, really." The Army pulled Bunzl out of the infantry and sent him to Ohio State University for a refresher course in chemical engineering, and from there to the chemical warfare service at Edgewood Arsenal, Md.

Following his military service, Bunzl returned to Shell Chemical in California. He turned down an opportunity to work for his uncle at Bunzl PLC, a paper-manufacturing company originally founded by his great-grandfather in Austria and relocated to England. But when the organization decided to open a company in Richmond, in 1954, Rudy Bunzl agreed to help run it. The decision was almost disastrous.

The company, located in the tobacco capital of the world, was started to make cigarette filters for the tobacco industry in an era when filters were made from paper.

"We almost went bankrupt," Bunzl remembers. "The American cigarette manufacturers decided to make their own filters. So, there really wasn't any business."

The company turned to exporting. "We started making filters in Richmond and exporting them to Latin America and the far East," Bunzl says. But it was the "creative genius" of an associate named Dick Berger that opened a domestic market. Bunzl says he and Berger made a good team.

"In 1960, we started selling ink reservoirs for marking pens, which grew out of cigarette filter technology," Bunzl says. "If you look inside any marking pen, inside there is a reservoir—a fiber reservoir, which the company made."

American Filtrona Corp. became the leading supplier of ink reservoirs for the writing instrument industry, and in 1970 the company diversified into plastics, acquiring Southern Plastics in Columbia, S.C.

The firm went public in 1972. It grew from sales of $247,000 and a loss in 1955, to sales of $2.2 million when Bunzl became president in 1959, then to $114 million and a net income of $6.4 million in 1986.

Principles that Bunzl says helped him lead his company include hard work, persistence, a willingness to give credit where it is due, discipline and a desire to be the best at what you do.

These are traits he has found to serve him equally well in retirement.
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Breaking Barriers

Janet Wylie made a habit of overcoming the obstacles of ‘a man’s world’ on her way to success in the world of international business

By Karen Hill

When Janet Wylie arrived at Georgia Tech from Jacksonville, Fla., in the early ‘70s, she discovered the realities of a male-dominated field, realities she would repeatedly overcome on her way to success in “the real world.”

As one of only two women in a class of 630, she had to search for women’s restrooms in classroom buildings, was graded by men’s standards in physical education classes, and was told repeatedly by a professor that she didn’t belong there—that she was taking a man’s spot.

After earning her civil engineering degree in 1977, Wylie went to work for Exxon in New Orleans as a production engineer—which meant living on an oil rig 100 miles off the coast with an all-male crew. She slept in the diesel generator room and slipped into the common shower area when it was available.

“I had lots and lots of job offers through the placement center, but the most interesting was with

Janet Wylie, chief executive of a Washington D.C. consulting firm, is president-elect of Women in Technology.
Exxon in New Orleans as production engineer, managing work going on in the field,” she recalls. What attracted her to it was the level of responsibility it offered.

Living on the rig, though, was “a little bit of a surprise.” She made it through by simply ignoring resistance and frequently soliciting feedback from the workers—a new experience for many of the crew.

Today, Wylie is chief executive of HCL James Martin Inc., a Fairfax, Va., consulting firm with 150 employees. It’s a joint venture between HCL Corp. of India and James Martin and Co. of Great Britain.

Wylie plans to take the company public on the NASDAQ exchange later this year. She’s also in the middle of evaluating potential acquisitions in Asia, Europe and the United States—all with an eye toward building HCL James Martin into a World Wide Web consulting powerhouse, particularly in the burgeoning field of electronic commerce.

She’s also president-elect of Women in Technology, an 800-member group whose numbers are a reminder that things have changed since those days aboard the oil rig.

That job lasted a year and a half. Homesick, she returned to Atlanta and a position in an entirely different field: finite-element modeling with the computing arm of McDonnell-Douglas.

Fortunately, Wylie had taken graduate-level computing courses at Tech as electives. Boeing lured her away to the Washington D.C., area, first with technical work, then with moves into sales, project management and marketing. Next came Xerox, where she ran a software company, an international division and part of its systems-integration work. Then came Computer Sciences Corp., where she ran the health care and outsourcing units.

“Computing is getting much better” for women, Wylie says, “because it’s a very discrete science. Your program either runs or it doesn’t. It’s very performance-driven; performers get ahead, and non-performers don’t, so a lot of gender bias is gone. That’s why a lot of the female CEOs coming up are in the high-tech world.”

In 1996, she moved to HCL James Martin, struggling after an early focus on fixing Year 2000 computer glitches—what Wylie calls a “go out of business” model because it leaves little to do after the year 2000. She has moved the company more into “Web-enablement” consulting, specifically helping companies set up ways to sell products via computer, or transfer data to clients or suppliers.

“Now, it’s all business management. I really do like running a company,” Wylie says.

It’s all business management nearly all the time, with days that begin with 5 a.m. jogs and end around 10 p.m.—and include a lot of travel. Still, Wylie found time to write a book, at the urging of her boss at Computer Sciences Corp.

Chances & Choices: How Women Can Succeed in Today’s Knowledge Businesses was published in 1996. In it, Wylie details the management techniques that have propelled her to the top: “always keeping the lines of communication open, always encouraging new ideas and really creating an environment where people feel important and feel cared about.”

Her door really is always open.

She meets individually with each employee periodically, and sends each a card on his or her birthday and employment anniversary. The employee who closes a big account gets a bottle of Dom Perignon champagne, one of several she keeps handy on bookshelves in her office.

For herself, there are “spa weeks.” She also grows roses.

Since Wylie’s days at Tech, when she was a Young Republican, she’s been interested in politics—an avocation that she is considering turning into yet another job.

“I’d like to run for office, but that’s pretty far off—seven to 10 years,” she says of a possible run for a U.S. House seat. “First, I’ve got to get this company to a bigger size and make a number of acquisitions.”

She’s also thinking about writing another book, this one on how to make international acquisitions. Already, throughout her career, she’s handled seven or eight.

Wylie is one of the relatively few women to reach the CEO spot by coming up through the ranks, rather than starting her own company.

“It didn’t matter how I got there, whether I started the business or someone else, as long as I’m in a position to influence it,” she says. “There are lots of things to change that can be done only at the top.”

That includes helping other women.

“Men still tend to get promoted faster and get paid more than women for the same job,” she says, citing as an example a software company she once purchased. “The men were making as much as 50 percent more than the women, with the same degrees, same years of experience and same performance. We did some serious salary adjustments for those women.”

Karen Hill is an Atlanta freelance writer.
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By Shawn Jenkins

ix it or close it.” Jeff Swanagan remembers the Atlanta Journal-Constitution headline that helped spur renovations to the decaying Atlanta Zoo in the mid-1980s. A former deputy director of the zoo, Swanagan, MS TASP '93, played a major role in the park’s resuscitation.

More than a decade later, similar headlines beckoned him South to help rescue another failing attraction. This time it was the $140 million Florida Aquarium—an unloved, seashell-shaped money pit nestled in Tampa’s channel-side district.

With only a small, unaccredited aquarium to show for its nearby, numerous aquatic wildlife, the Tampa Bay area was searching in the early 1980s for a site to build a world-class showcase for its watery inhabitants. Clearwater balked, citing an already heavy flow of tourists, and a dozen other locations said “no” before a site was picked near Tampa’s port—an area targeted for revitalization.

“The original business plan assumed that other projects would be built around it,” Swanagan says. “Well, it didn’t happen. The aquarium opened in March 1995, and it was the only thing out on the street. They didn’t adjust the business plan—which projected 1.8 million visitors—to account for the lagging construction in the area. And they were going to pay the $84 million debt out of operations. There are very few zoos and aquariums across the country that can do that. It takes a Busch Gardens or a Sea World to do it. It didn’t work.”

Eventually, the city floated bonds to bail out the floundering fish tank. The bond issue bypassed the voting public and was pushed through by the city leaders.

“That put the people on edge,” Swanagan says. “And when they opened the aquarium, it opened a little too early. The tanks were murky and there weren’t enough animals.”

The local media smelled blood in the water and schooled in for the kill. “They just went crazy,” Swanagan says. “Some of those headlines were horrendous—as they were in 1984 with Zoo Atlanta. It was kind of a big thing to kick the aquarium.”

Further tarnishing the aquarium’s image was an introductory ticket price of $13.95—the highest price among all of the big aquariums, in the lowest per-capita income market.

“If you look at prices for Sea World, Busch Gardens and Disney, $13 looks pretty good compared to $44,” Swanagan points out. “So the tourists thought it was a great deal. To the locals, however, that was a bit much.”

Winning back the hearts and minds of Tampa Bay residents—and media—was Swanagan’s first order of business. Since taking the helm in April 1998, he has made ticket prices more palatable, increased his volunteer base and educated more than 60,000 school children while substantially lowering the attraction’s debt—a task that nearly dissuaded
Swanagan from accepting the aquarium job.

"I was not a serious candidate for the position," says Swanagan, who considered his interview to be little more than a fact-finding mission for an aquarium feasibility study he had been conducting for Zoo Atlanta.

"The day before my interview, I did what's called a mystery shop," he explains. "I wanted to walk through the aquarium and make out a report because I knew it would be the only time I would see it for the first time. No one knew I was here. I engaged the parking attendant, the staff for admissions, gifts, food. I went to the restrooms, checked out the dive show, talked to the volunteers. I was so impressed. I thought, 'Whoa, what a beautiful place.' Then I said to myself, 'Too bad that debt is there. I'm not going to take this on and have to pay $4 million a year of debt.'"

When Swanagan got to the interview, he was told that the city of Tampa would absorb the debt. His interest was piqued.

With assurances from the city fathers that "draining the tanks" was not an option, Swanagan's transition from turf to surf was complete.

"People ask me what's the difference between running a zoo and an aquarium," he says. "Before, there were gorillas outside my door. Now, there are sharks."

Swanagan was initially exposed to the animal kingdom while studying science education at Ohio State University. An internship sent him to the Columbus Zoo, where his role as a keeper evolved into director of the zoo's education center.

Taking the advice of Columbus Zoo director and David Letterman Show regular Jack Hanna, Swanagan sought to bolster his résumé under the tutelage of Atlanta Zoo director and Georgia Tech psychology professor Terry Maple. After 11 years at Zoo Atlanta—with moonlighting stints at Albany's Cheehaw and Stone Mountain's Wild Animal parks—the former science teacher was ready to move on to another subject.

"At this point in my career, it's really fun to have some kind of new content to learn. I know a lot about gorillas and reptiles, so now to learn about the fish world is just fantastic."

The Florida Aquarium tour follows the journey of a drop of water as it percolates up from a subterranean aquifer and travels through five Florida habitats: wetlands, bays and beaches, coral reefs, and offshore.

Sharks, fish and rays abound, while other animals—including otters, Roseate Spoonbills and a rare, blue-eyed, white alligator—populate the landscape.

Educational programs—Swanagan's stock-in-trade—constitute a large portion of the facility's activities. The aquarium features two fully equipped classrooms and hosts on-site programs as well as field trips and educational outreach. An overnight program called "Sleeping with the Fishes"—an aquatic version of a Columbus Zoo sleep-over Swanagan pioneered in the late 70s—gives kids ages six and older the chance to slumber among the sea creatures.

Exhibits are hands-on and interactive, allowing visitors to pet dogfish or compare their brute strength to the bite-pressure of a shark by pressing down on a bar. Even the dive show, held in a fully stocked 500,000-gallon tank, serves as a question-and-answer session between audience and diver.
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A Tech professor “prepared me for work where we deal with some hefty issues: animal rights and welfare, conservation issues.”

Swanagan’s latest venture, “Frights of the Forest,” exposes visitors to a cast of land-faring critters, including poison dart frogs, tarantulas, pythons and vampire bats.

When Swanagan went to work for Zoo Atlanta in 1987, and later began graduate studies at Georgia Tech’s School of Public Policy, he found a kindred spirit in Dr. Bryan Norton, a professor of environmental ethics.

“I don’t think I would’ve gone to Tech if it weren’t for Bryan,” Swanagan says. “He really prepared me to do this kind of work where we deal with some pretty hefty issues: animal rights, animal welfare, conservation issues.”

A native of Cleveland and nearby Lake Erie, “I was always oriented by bodies of water. Everybody gets excited about these reservoirs. To me, it’s not water if I can see across it.

“I used to come to Florida with the Ohio State University scuba club. We dove in Crystal River, the Ichetucknee River, Panama City. I thought, ‘That’s living.’ So now, to get to work here and go diving as part of my job—it’s not a hard thing. I’ll call home to my dad in Ohio, who’s been snowed-in for two weeks, and say, ‘Dad, it’s 80 degrees.’”

Understanding the lure of central Florida’s balmy disposition in the middle of winter, Swanagan is keen to reel in Northerners as they seek refuge at nearby attractions.

“I say, ‘let Disney or Busch Gardens or Sea World yank ’em down,’” he says. “And then it’s our job to get them to come over here.”

Once they do, Swanagan sees the once-maligned oyster shell yielding Tampa Bay’s long-awaited pearl.
"I pretty much always knew I wanted to work for GM in the auto industry," Thayer says.

From his beginnings as a young student/employee, Thayer rose to become plant manager for the GM Assembly Plant in Doraville, Ga., in 1977. GM is the only employer he has ever had, except for his uncle, who hired him to work on the family farm when Thayer was a boy.

“I found out what I didn’t want to do. I didn’t want to milk cows for a living,” he says.

The money he saved from working on the farm bought Thayer his first car—a 1969 Cutlass convertible—when he was 16. A year later, he went to work for GM, enrolling at GMI as a student-in-training assigned to the Oldsmobile Division in Lansing, Mich. Even when he came to Georgia Tech on a GM fellowship, he stayed on the GM payroll.

Thayer started his career as a manufacturing engineer, which means he took product designs and figured out how to manufacture them—setting up the workplace, buying the tools—an occupation that has mechanical engineers, electrical engineers and industrial engineers operating in it, he says. “That’s how I got interested in a master’s in industrial engineering. I got more intrigued with some of the IE functions in manufacturing engineering than some of the hardcore ME stuff.”

Following graduate school Thayer returned to Michigan in 1980, working for the materials staff in manufacturing systems “back when we were just putting our first plant-floor computer systems in.” In 1983, he began the corporate-ladder shuffle with his first management assignment outside of the engineering organization of GM. Thayer joined the assembly plant in Lansing as an assistant superintendent.

“I bounced around there and had superintendent jobs in three different departments,” he says.

Six years later, Thayer went to Detroit and an engineering job where he was responsible for manufacturing and design engineering for the bodies in the small-car group.

In 1991, Thayer returned to Lansing as assistant plant manager, then went back to Detroit in 1994 as executive director of North American production control, responsible for scheduling and materials systems for all the North American assembly plants.

Thayer moved to Atlanta in 1997, taking over the Doraville plant, which manufactures minivans—Chevrolet Venture, Pontiac Montana, Oldsmobile Silhouette and Opal Sintra. Production will halt this year on the Sintra, which was built for European distribution.

“This is the only plant that builds General Motors front-wheel-drive minivans,” Thayer says, referring to the vehicles as “today’s station wagons.” The Doraville plant turns out 1,100 vans per day, and Thayer has to utilize as much overtime as possible to keep up with demand for the popular vehicles.

Thayer’s typical workweek is 60 hours. And during those long weeks, he says, “My technical background comes into play every day—both my mechanical engineering background and my industrial engineering background. My awareness of the engineering contribution to building a product is what’s important. There’s not a day goes by that something doesn’t come up, and I think, ‘If I didn’t have an engineering degree, I wouldn’t understand what they were talking about.’”

Since 1986, Thayer has led the General Motors University Relations Team for Georgia Tech. Comprised of GM employees, the 11-member team recruits Georgia Tech students to work for GM, promotes the automaker to potential employees on campus and handles grant administration. Team members work for company operations around the country.

Last year, GM donated two engines for mechanical engineering labs at Tech. The corporation supports the "GT Motorsports Club" and hires co-op students. Currently, there are six Tech co-op students at the Doraville plant. His efforts on behalf of the Institute earned Thayer the Young Alumni Award from the College of Engineering in 1995, and in 1997, he was inducted into the Industrial and Systems Engineering Academy of Distinguished Alumni.

“We are very appreciative of all the interactions we have with GM, especially those at the Doraville plant. We appreciate Randy’s leadership and his support of Georgia Tech,” says Michael E. Thomas, provost and vice president for Academic Affairs.

Thayer and his wife, Cindy, have two teenage daughters. When not at the plant, Thayer likes to spend time on Lake Lanier with his jet boat and jet skis, or on the asphalt riding his 1993 Harley-Davidson.

The newest GM product in the Thayer family is a Yukon Denali. But if Thayer could, he would drive a 1966 Toronado. “It was the first mass-produced front-wheel-drive vehicle. I owned a ‘69 one time as a second car. I wish I had kept it.”

Carol Carter is an Atlanta freelance writer.
A New Arena

Former quarterback John Dewberry develops a gameplan to restore Atlanta's Midtown

By Shawn Jenkins

John Dewberry has always relished being in the middle of the action. The bigger the game, the better he performs. Now, 15 years after he hung up the spikes that carried him to victory as quarterback of the Yellow Jackets' football squad, Dewberry finds himself under pressure to perform again, leading the charge to change the face of Midtown Atlanta.

With his company's recent development of Peachtree Pointe, a two-building, 500,000-square-foot office complex at the juncture of Peachtree, West Peachtree and Spring streets, Dewberry, Mgt '86, president of Dewberry Capital Corp., breaks ground on a dream that, ironically, has its roots on the gridiron.

"When I was back at Georgia Tech, we'd be practicing on Grant Spring 1999 • GEORGIA TECH 75
Field or Rose Bowl Field, and you’d feel like you were in a pastoral setting in the country,” he says. “Then you’d look up and see the Southern Bell building. That was something that attracted me—the verticality of real estate.

“I used to go to this little café in Pershing Point where I could hide and nobody knew where I was. Right across from it was this property that we’re building on now. Even then, I thought it would be an interesting place to develop, so I investigated it for a class project I was working on at the time.”

Untouched for nearly a decade, this northern gateway to Midtown had been a Bermuda Triangle of real estate as a number of efforts to develop the property fell through the cracks.

But Dewberry, as brash and confident as when he managed a huddle, stepped in to seal the deal.

By his own admission, Dewberry is a self-promoter, making up in moxie—both in football and business—what he lacks in the more measureable assets of height, weight or experience.

He started his company at the age of 25 with a $5,000 signing bonus from his short stint with the Canadian Football League’s Calgary Stampeders, and some money he had saved while working in the banking business.

“It was the teeth of the recession, and in the real estate business it was probably a depression,” Dewberry says. “At the tender age of 25, you’re not supposed to be successful. So that probably worked to our advantage. But when no one else could, we were able to borrow $4 million to build a shopping center in Charleston, S.C., in 1991. That really was a catalyst for building what is today a company that has developed more than $200 million worth of real estate.”

“Every block, every catch, is important to the game. If any one person doesn’t do his job, the team will fail. If you have a weak link, you need to shore it up the best you can, but you still need to move the ball downfield. I’ve been able to do that in business.”

His time on the Flats was equally ambitious. A transfer from Georgia, Dewberry found himself holding a clipboard his first season, watching a lackluster Yellow Jackets offense lose games.

“Coach [Bill] Curry and I got into a couple of heated conversations because he wasn’t playing me, and I thought he should,” Dewberry says. “I thought about quitting football. But a man named Howard Ector, Mgt ’40, had lunch with me, and we talked. He came to me and told me he’d played quarterback, too, and he asked me about my family—we never once talked about football.

“That meeting changed my career. From then on, we started winning football games. Big games. I got yelled at because I called a lot of audibles, but we were winning.”

The lessons learned on the field now serve Dewberry in the real estate arena.

“It taught me to balance a lot of balls and be in charge of a lot of things,” he says. “It gave me the mental capacity to understand the big picture. Every block, every catch, every run is important to the big picture of the game, and if any one person doesn’t do their job, the team will fail. If you have a weak link, you need to shore it up the best you can, but you still need to move the ball downfield. I’ve been able to do that in business.”

The development of Peachtree Pointe is just the beginning of Dewberry’s gameplan. He has designs on a boutique hotel and other multi-use properties in what he calls “the next great destination 24-hour city.”

“[Midtown] was the place to live in the fifties and sixties, and became blighted starting in the late sixties through to the early eighties,” Dewberry says. “With the advent of high-rises and its transformation into a more corporate address, it became acceptable again.

“But what really has driven Midtown, and will continue to drive it, as opposed to downtown, is the core residential base that has existed there for years. Ansley Park is one of the finest neighborhoods anywhere. You have Collier Hills, the Piedmont Park area, Virginia Highlands, Brookwood Hills—all these provide a residential core that you don’t have once you get south of North Avenue. That, combined with the fact that Atlanta has the longest average commute of any major city in this country—and people are tired of it.”

The transformation of the nearby Atlantic Steel site into a retail-oriented property and the distinction of Midtown as the cultural and arts center of Atlanta are other factors Dewberry cites for his optimism of the area’s continued growth and revitalization.

But in the end it’s the buildings themselves Dewberry cherishes as a legacy. An admirer of renowned architect and fellow Tech alumnus John Portman, Arch ’71—whose creations helped define Atlanta’s skyline—Dewberry enjoys the thought of his Midtown developments someday shadowing future generations of Yellow Jackets as they sweat it out on the cloistered confines of Tech’s Rose Bowl or Grant fields.

“I enjoy the permanence of what I do,” he says. “If you can build something of quality that people enjoy, it will have permanence because no one will want to tear it down.”
Mercer University in Macon, Georgia seeks candidates for Dean of the School of Engineering. The vision of the School is to become the premier undergraduate engineering teaching institution in the Southeast.

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You Can Make A Perfect Match Every Time
through your company's matching gift program

Georgia Tech alumni in each of the 115 companies listed here have participated in their company's matching gift program. Each company has an alumnus who has volunteered to act as the matching gift coordinator and rally support for Georgia Tech's 52nd Roll Call.

If you work for a matching gift company that matches an academic contribution to Georgia Tech, you can greatly increase the impact of your gift to Roll Call. Some companies match contributions dollar-for-dollar, while others will double, or even triple the amount of their employees' gifts.

The companies listed here led the way in raising over $1.48 million in matching gift funds during the 51st Roll Call. Several companies have up to 66 percent of their Georgia Tech alumni participating in their matching gift program. Working with your fellow alumni and your matching gift program, you too can make a positive difference in the future of Georgia Tech.

If your company is not listed here, you may still work for a company that will match your gift to the 52nd Roll Call. Please contact your company's human resources department to determine your company's matching gift policy. To locate your company coordinator, or to volunteer to become the matching gift coordinator at your company, please contact Brett Breen at the Georgia Tech Alumni Association.

Brett Breen, Matching Gift Program Coordinator
Georgia Tech Alumni Association
190 North Avenue
Atlanta, Georgia 30313
Telephone: (404) 894-0766
or 1-800-GTALUMS
e-mail: brett.breen@alumni.gatech.edu

For information updates on the 52nd Roll Call, please visit www.alumni.gatech.edu/Roll Call

Leading Matching Gift Companies

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A unique biomaterial developed at Georgia Tech is undergoing trials and could be available in as few as five years for patients needing artery or knee cartilage replacement.

The substance, dubbed Salubria, may also be used to speed repair of damaged nerves in patients with spinal cord injuries and as the basis for an implantable drug-delivery system.

The biomaterial is unique for several reasons, researchers said. It is biocompatible with body tissue because of its attraction to water; researchers can adjust its mechanical strength as needed; it is compliant like normal body tissue; and it is made from an organic polymer, rather than silicone.

Initial laboratory testing is complete, and investors have been secured for a private start-up company to produce and market Salubria. Those researchers are now beginning the five- to seven-year process of obtaining approval from the Food and Drug Administration. That process will include testing in humans.

"The goal is to get the medical implant out to help patients," says lead inventor Dr. David Ku, a professor of mechanical engineering at Georgia Tech and a professor of surgery at Emory University. "But we first need to make sure it's very safe to patients and that it benefits them."

A patent has already been allowed on the "hydrogel." The Georgia Tech Research Corp. and Ku will hold the patent, which is expected to be formally granted this spring.

Salubria has a high water content, making it similar to, and thus biocompatible with, human tissue, Ku explains. It is also unique in three other properties. It is an organic polymer, rather than being made from silicone, which is suspect in inflammatory disorders in breast implant patients. Second, it has enough mechanical strength that it will not burst under normal physiological conditions. And Salubria has enough elasticity and compliance that it will pulsate in rhythm with the heart under normal physiological conditions.

"When people touch samples of Salubria in its vascular graft (artery replacement) form, they describe it as noodle-like or similar to calamari (squid)," Ku says. "I think it feels very much like an artery. As a knee cartilage replacement, Salubria looks and feels like the white, shiny cartilage at the top of a drumstick."

To date, tests in rats, dogs and sheep show that Salubria is biocompatible: Platelets do not adhere to it in significant quantities, and thus the chance of blood clots is greatly reduced, Ku explains. Such has been the problem with Dacron, which surgeons have used for artery replacement in the abdomen and legs since its development in the 1950s. Other evidence of Salubria's biocompatibility is that it allows new cells to grow on it, effectively making it part of the body, Ku says.

Proof-of-concept studies showed Salubria's potential for use in artery replacement, including those in the heart because of its mechanical strength. Also, Salubria shows great promise for meeting the large demand for knee-cartilage replacement in patients suffering from sports injuries, rheumatoid arthritis and osteoarthritis, Ku says.

"Salubria acts like a shock absorber or water bag between bones in patients with arthritis or sports injuries to the knee," he adds.

In addition, these studies suggest Salubria can serve as a nerve guide to create a physical bridge that could dramatically increase the speed at which severed nerves heal.

"This ability to speed the healing process could eventually help patients with spinal cord injuries, like [actor] Christopher Reeve, to walk again," Ku says.
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As an implantable drug-delivery system, Salubria may work for many drugs, such as insulin and morphine, which need to be injected, Ku says. Proof-of-concept studies will continue as Ku tries to improve the biomaterial and broaden its application, he said.

After about two years of research, Ku and his students developed Salubria in 1996. In February 1998, he started Restore Therapeutics, the Atlanta-based corporation that holds the exclusive license to produce and market Salubria.

Ku is grateful for what he calls Georgia Tech’s vigorous movement toward technology transfer. He received $49,000 from the Tech-based Advanced Technology Development Center’s (ATDC) Faculty Research Commercialization Program in fiscal year 1998. The grant and ATDC’s business advice helped him start Restore Therapeutics.

"Most professors are not business people," Ku says. "Without this sort of technology-transfer assistance, a lot of useful technology would never make it to market."

Jane Sanders is editor of Research Horizons, the Georgia Tech research magazine.

Physics Professor William Ditto seeks "an entirely new computing paradigm."

A revolutionary new computing technique that uses a network of chaotic elements to "evolve" its answers could provide an alternative to the digital computing systems widely used today. Described for the first time in Physical Review Letters, this "dynamics-based computation" may be well suited for optical computing using ultra-fast chaotic lasers and computing with silicon/neural-tissue hybrid circuitry.

The system has so far demonstrated an ability to handle a wide range of common operations, including addition and multiplication, as well as Boolean Logic and more sophisticated operations. "We have shown that this can be done, but we’ve only seen the tip of the iceberg," says physics Professor William L. Ditto. "This is a glimpse of how we can make common dynamic systems work for us in a way that’s more like how we think the brain does computation. It’s an entirely new computing paradigm."

For many years, scientists have observed the rich variety of behavioral patterns created by chaotic systems, including those found in living organisms. Ditto and collaborator Sudeshna Sinha of the Institute of Mathematical Sciences in Madras, India, reasoned that these natural chaotic systems should have been eliminated through evolution unless they served a purpose.

Ditto and Sinha devised an experiment to see if a simple network of chaotic computer elements could be made to handle computations. They joined the chaotic elements into a lattice using an adaptive connecting mechanism that would open whenever an element exceeded a certain critical value. Elements containing values above the critical level triggered the connecting mechanism, allowing the excess value to "avalanche" into neighboring elements. That transfer then created additional avalanches in other connected elements. With additional stimulation, the domino effect continued until the imbalance was conducted out of the system as the answer to the mathematical problem.

"We have the elements interconnected so they respond to their neighbors like the avalanching that occurs when you pile grains of sand onto a sandpile," Ditto explains. "You allow the elements to avalanche and the system to evolve chaotically, then do the avalanching again until the system settles down to the right answer. It takes a couple of iterations for it to settle down."

In a simple example, values of three and four would be encoded into a system set with a critical value
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of one. The values would create an imbalance that would avalanche through the chaotic elements until it was conducted out of the system—as the value of seven.

"The system develops its own rules that we are simply manipulating," Ditto explains. "It is using pattern formation and self-organized criticality to organize toward an answer. We don't micromanage the computing, but let the dynamics do the hard work of finding a pattern that performs the desired operation.

"There are a surprisingly large number of ways that the system can perform the computations and give you the answer."

Beyond the systems they have tried, Ditto believes virtually any coupled dynamic system could be used to perform computations.

"We hope that you can take any dynamical system, stimulate it in the correct way, and then get it to perform an operation for you," he says. "This would provide an alternative to engineering a system from the ground up."

John Toon is manager of the Georgia Tech Research News and Publications Office.

### Nanotube Properties

Open ‘Broad New Field of Study’

Carbon nanotubes hold promise for weighing minute objects, including such things as viruses

Newly discovered properties of carbon nanotubes open the door to a variety of micro-mechanical devices such as a balance to weigh materials previously too small to gauge accurately.

Georgia Tech researchers described in the journal *Science* how electrical voltage can be used to bend the nanotubes or cause them to vibrate at select frequencies, opening potential micromechanical applications for the tiny structures.

Researchers studied the behavior of the nanotubes using a transmission electron microscope with a unique sample holder designed and built by Tech's Dr. Philippe Poncharal. The holder allowed them to rotate specimens, apply electrical voltage and observe many fundamental effects.

"This opens a broad new field of study," says Dr. Walter de Heer, a professor in Georgia Tech's School of Physics. "To show that we can manipulate individual carbon nanotubes while examining them with an electron microscope is breaking new ground. This allows us to use the microscope in a much more interactive way, with direct visualization and control."

By applying a charge to a nanotube placed near an oppositely-charged probe, the researchers were able to severely bend the tiny structures. The researchers also created resonance in the nanotubes by applying an oscillating voltage to the tiny structures.

The resonance occurs in a very narrow range, a fact that allows the scientists to measure the damping properties of the nanotubes. "These resonances were very narrow, so finding them was like tuning for an unknown radio station—you just keep looking," de Heer notes.

Using the tiny tubes as a "nanobalance" depends on the ability to calculate changes in the resonant frequency that occur with placement of an object onto a nanotube.

"This is comparable to putting an object on the end of a spring and oscillating it," says de Heer. "By knowing the properties of the spring, you can measure the mass of the object."

Applying this technique, the researchers were able to measure the mass of a 22 femtogram graphite particle attached to the end of a resonating nanotube. "There is no other way to weigh accurately something that small," he notes.

Beyond the small particle measured so far, the researchers think the nanobalance could be used for determining the mass of other tiny objects such as viruses. —John Toon GT

Oscillating nanotubes give scientists the ability to weigh minute particles.
Internet2
Abilene Network test bed for future 'Net

By Elizabeth Campell

The Abilene Project, the most advanced research and education network in the United States, began nationwide operations this spring, delivering high performance network services—Internet2—to 37 universities.

And just as railroads made Atlanta a major transportation hub, new advanced national networks continue to make the city—and Georgia Tech—a major interchange for information.

An Internet2 member, Tech expects to connect to the exclusively educational and research network this year. Tech and other Georgia institutions banded together last year to create the Southern Crossroads (SoX) GigaPoP, which provides institutions in Georgia, Florida, Alabama, and other surrounding states with a connection to Internet2 and Abilene.

The first building block for the Southeast’s access to Internet2 came in October 1997, when North Carolina and Georgia made a key connection for potential Internet2 users.

Abilene serves as a test bed for Internet applications of the future such as distance learning, telemedicine and digital libraries. Qwest Communications, Cisco, Nortel Networks and Indiana University are contributing $500 million in equipment and services to the project.

"Today’s Internet, even at its fastest, will not support important research and education applications, such as remote manipulation of scientific instruments and storage and transmission of massive experimental data sets," says Gordon D. Wishon, associate vice president and associate provost for Information Technology at Georgia Tech. "Practical application of digital video, such as telesurgery, will not be possible without Internet2."

Internet2 will initially be 600 times faster than current T1-based networks, and will offer substantially improved quality of service.

Qwest Communications has delivered 10,000 miles of advanced fiber optic network and engineering support. Cisco has provided high-sped communications equipment that enables the integration of data, voice and video—and ongoing engineering support for all eleven nodes of the Abilene network. Nortel Networks has provided network planning and engineering services, network management, and optical networking capable of a transmission rate of 10 gigabits per second. Indiana University runs Abilene’s Network Operations Center and has provided Abilene with problem determination and resolution and asset management.

Judy Estrin, chief technology officer at Cisco Systems, says her company is "committed to advancing the capabilities of the Internet by delivering integrated data, voice and video as well as other higher level services. Abilene and other Internet2 projects provide the testing ground for universities to develop these advanced applications."

Likewise, Nortel’s Mike Unger said his firm is dedicated to providing maximum reliability with its 10-gigabits-per-second optical platform. And Indiana University’s vice president for information technology, Michael McRobbie, lauded the new ‘Net’s potential for "unsurpassed networking capabilities for teaching and research."

"Indiana University is delighted to be a partner in Abilene and to provide the Abilene Network Operations Center, which will support the research and education community’s needs by providing outstanding expertise in network management for the physical and operational aspects of the Abilene," McRobbie says.

A primary goal of Abilene is to support the efforts of the Internet2 project. To enable collaboration among university and corporate Internet2 members, Abilene will also connect corporate research labs; among the first will be IBM’s T.J. Watson Research Center in Westchester County, N.Y., and IBM’s Almaden Research in San Jose, Calif.

"The remarkable collaboration among the Abilene Partners has provided Internet2 members with unsurpassed networking capabilities," says Dr. Douglas E. Van Houweling, president and CEO of UCAID, which is leading the Internet2 and Abilene projects. "Just as the research networks of a decade ago produced technologies that have transformed the way we all work, learn and live today, Abilene will help develop the technology we will all use tomorrow." GT

Elizabeth Campell is a writer with Georgia Tech’s Institute Communications and Public Affairs office.
Bert Thornton, IM '68, hears that a lot. He's the Bert behind "Bert's Chili," a Waffle House tradition. Waffle House customers order more than 4 million bowls of his chili every year, and patrons across the country are just now realizing that there really is a guy behind the special recipe. Tradition is something Bert Thornton knows about.

His involvement with Georgia Tech can be traced back many years, starting with his support for another tradition: Roll Call. "I've always been grateful for what Georgia Tech has done for me, and I believe it is important to give something back."

The tradition of Roll Call was started in 1947. Today, Roll Call funds are used to support a variety of areas at Georgia Tech, including student scholarships and financial aid, faculty recruitment and retention, and new academic programs. Each of these areas helps to strengthen the academic reputation of Georgia Tech. For alumni, that means an even more valuable Georgia Tech degree.

The tradition of giving at Georgia Tech can be summed up in a word: participation. The 52nd Roll Call is underway and alumni support is key, not just in the amount of the contributions, but also in the number of alumni who participate.

By the way, did you look closely at Bert's name tag?

Now THAT's a tradition!

Look for Roll Call on the World Wide Web at www.alumni.gatech.edu/rollcall
Dave McGill once bragged he was the best liar in Georgia. Now that was a stretcher. Truth be told, David J. McGill was only the second-biggest liar in the state.

Even though McGill’s yarn about being related to Albert Einstein and exceeding the speed of light left other professors slack-jawed, judges in the American Historical Society’s Annual Lying Contest said there was an even bigger liar around.

“I considered myself to be the best liar in Georgia,” McGill boasts, “because the winner was from Tennessee.”

If lyin’ and communicating are the same kettle of fish, McGill’s at the top in either category. The lyin’ part came after McGill helped launch Techmasters, the Georgia Tech equivalent of Toastmasters. Six years ago, he entered the organization’s Tall Tales contest and came in third in the state finals. When he took the same tale to the American Historical Society contest, he came in second.

McGill, director of Georgia Tech’s Center for the Enhancement of Teaching and Learning, discovered his skills as a communicator when he was 13 years old and being considered by the Slidell, La., high school football coach as a future quarterback.

“I was good at basketball and baseball, but not so hot at football,” McGill acknowledges. “I just kept getting killed day after day.”

The Slidell-St. Tammany Times newspaper was looking for a part-time reporter, and McGill, who also could draw, landed the job.

“I convinced the coach I would do the Slidell Tigers much more good writing stories about them and drawing cartoons about the mascot and players than I ever would as a quarterback,” McGill recalls. “I think that job saved my life.”

By his senior year, McGill covered sports for three newspapers. He debated journalism as a career.

“I was almost down to flipping a coin as to whether I would go into journalism or engineering,” McGill says. “I decided that I could always write and draw if I went to engineering school, but not the other way around. It has worked out well.”

As a student at Louisiana State University, he was hired as a cartoonist for the Baton Rouge, La., Morning Advocate and was the cartoonist for the LSU Daily Reveille. It was also at LSU that he met his wife, Carolyn.

After earning bachelor’s and master’s degrees in engineering from LSU and a doctorate at the University of Kansas in 1966, McGill joined the faculty at Georgia Tech as an assistant professor in the former School of Engineering Science and Mechanics.

“As a boy, I was a Tech fan,” says McGill, whose father, the late Chambless McGill, graduated from Tech with a commerce degree in 1928. “Everyone else in the state was for LSU or Tulane.”

McGill, who comes from a family of teachers on his mother’s side, says his own life has been profoundly influenced by teachers. “I had superb teachers all my life. I can still name all of my teachers from first through eighth grades. We had our 40th high school reunion last year—and we all agreed that our teachers had a huge influence on us.”

Two of his teachers in engineering school also had an impact on McGill. Although they taught large classes, they learned—and constantly used—the name of every student. When he became a teacher, McGill decided to emulate them.

“It became a hallmark of my own teaching—getting to know the students,” McGill says. “Being able to say that I learned the names of all my students is something I’m proud of.”

During his 33-year teaching career at Georgia Tech, he has taught about 5,000 students.

During the 1970s, McGill worked with Scientific-Atlanta to solve prob-

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**The McGill File**

- **Born:** Oct. 9, 1939, in New Orleans. Grew up “across the lake” in Slidell, La.
- **Education:** BS, electrical engineering, Louisiana State University, 1961; MS, engineering mechanics, LSU, 1963; Ph.D., engineering mechanics, University of Kansas, 1966.
- **Personal:** wife of 38 years, Carolyn. Three children, four grandchildren.
- **Achievements and Honors:** Professional engineer (Ga.), Institute-wide Awards for Outstanding Teacher (1974, 1986), Research (1968), and Service (1989), ANAK Faculty Award (1990), Carnegie Foundation Georgia Professor of the Year (1996), Eagle Scout. Co-authored two engineering textbooks now in third editions.
- **Leisure Interests:** Folk-singing/banjo-playing, writing and drawing, investing, storytelling.
Banjo-playing Dave McGill: Guiding Tech's teachers to greater skills in communication.

For the past dozen years, McGill's main thrust has not been teaching students in the classroom, but teachers themselves. He is the founding director of the Center for the Enhancement of Teaching and Learning.

In July, McGill retires from Georgia Tech, and his last year has been one of the most rewarding. In February, Georgia Tech was presented the Hesburgh Award, the most prestigious honor for teaching given an American institution of higher education (for more on the Hesburgh Award, see page 54).

McGill has received a number of achievement awards. He was presented the Outstanding Teacher Award in 1974 and 1986, and was named Carnegie Foundation Professor of the Year in Georgia in 1996. He received Tech's research award in 1968, service award in 1989 and ANAK Faculty Award in 1990.

"Being recognized as the ANAK professor was to me the highlight of my teaching career," McGill says. "It was a total surprise.

"However, I think my wife, Carolyn, would agree that our greatest accomplishment in life was raising three kids to be wonderful, responsible adults," McGill says.

In his retirement, McGill plans to make more time for banjo-playing and folk music, learning to cook gumbo, and writing a book. "I want to put all of my stories into a book—Techmasters speeches, stories I've written for newspapers, others still in my head—put them all in a book, publish it myself and give a copy to everybody who's in it."

McGill, a member of Holy Cross Catholic Church in Chamblee, Ga., said he also wants to deepen his spiritual life. "Although I hope it's 25 years away," he says, "I want to start getting ready for my final exam."
"The Kid" Meets Generation Wrecks

Legendary Boston slugger Ted Williams shares a word with former all-American Yellow Jacket and pro Rookie of the Year Nomar Garciaparra during ceremonies at the Hitters' Hall of Fame in Florida. The 80-year-old Williams had high praise for the young shortstop, saying Garciaparra will be "as good as anyone who has ever played the game." GT
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