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A Rave for Arant, A Bunk for Burdell

One of my favorite professors at Georgia Tech was Dr. Roscoe Arant—an absent-minded industrial management professor who adorned his portly form with a three-piece suit and color-coordinated tie.

I only had one class with him—at 8 a.m. on Monday, Wednesday and Friday. As he lectured, he wandered about the room, peering through his glasses at the notes he expected us to record.

I was working my way through school as a night clerk at a small hotel in a residential area. Usually, I was able to grab five or six hours sleep, but on a busy night, that might shrink to only one or two. On those night-sleepless nights, I would be "plum tuckered out" during my eight o'clock class.

To give the appearance of rapt concentration, I had learned to entwine my legs in the rungs of the student chair, place my left elbow on the desk arm, my left hand shadowing my forehead above my eyebrows. In my right hand I held my trusty Scripto pencil, poised over my notebook so that I would be ready to write if the need arose.

What I was really doing was applying the engineering principles of construction and strength of materials to be sure I didn't fall out of the chair should I doze—which I often did.

When the professor felt that I was off in dreamland, he would walk behind me without breaking his leisurely stride and give me a sharp rap of his knuckles en passant. I would sit up, move my left hand to rub my chin, and write down any words he might be saying.

A year or so after his class, I saw him walking on campus during the lunch hour. After a few moments of reminiscing, he said suddenly, "I really must go." He looked both ways, clearly puzzled, and asked, "Which way was I heading when you stopped me?"

"You were coming from the direction of the Economics Building."

"Oh, good," he said merrily. "Then I've had lunch."

The hotel, which catered to salesmen, was owned by a wealthy real estate broker who had refurbished it. I worked the graveyard shift—from 11 p.m. to 7 a.m.—and received the princely salary of $75 per month and a room in the hotel. Not really a bad deal in the early 1950s.

I had many interesting experiences in the hotel and didn't realize at the time that it was fertile ground for some of the characters who later would inhabit my plays and stories. Only one experience made the papers.

One of our regulars was a market researcher, who offered me the use of his car to squire mother around the city on Saturday. He gave me the keys and said to leave them in his mail box when I finished, and not to worry about the gas; it was a company car. "It's a black car that'll take you anywhere."

"Isn't it a black car that'll be parked across the street?"

The next morning, mother and I started early. He hadn't told me the make, but the key was to a General Motors car, and we got into a black Chevrolet parked across the street. I drove all day around Atlanta. I showed Mom the Tech campus, the state capitol, the Cyclorama in Grant Park, several other tourist draws and the Varsity drive-in—if you knew Atlanta before the expressways, you know why the Varsity was an attraction.
lieutenant. Hurriedly we rearranged our hooch to appear as if it housed 20 men instead of seven. We put sheets and blankets on extra bunks, shoes and boots under them, and name tapes on the lockers. I put "George P. Burdell, Major" on one of them.

When the new "second balloon" made his inspection, he carefully noted that we had 20 spaces in the 20-man facility, all apparently occupied. He paused only once, in front of Burdell's locker.

"Burdell," he muttered. "That name's familiar."

I broke in nervously. "He and I went to college together. Georgia Tech."

"Georgia Tech," he repeated as he looked me fully in the face. "I see."

He left, and we returned our quarters to their former spacious conditions, and were never again bothered during the remainder of my tour.

The day I left Pleiku, I checked out with the billeting office. The lieutenant saw me, came from his office to shake hands and bid me farewell. "If you see Maj. Burdell, tell him hello for me," he said.

I looked into his office. On the wall behind his desk was a large, gold pen­nant emblazoned with white letters that shouted, "Georgia Tech, Class of '64."

Yep. I had really put one over on the young lieutenant.

Ralph Baber, IE '54
Air Force lieutenant colonel (retired)
Tow, Texas

Ralph Baber is an award-winning, weekly columnist for The Picayune. At Tech he was a member of the Phi Sigma Kappa fraternity and Air Force ROTC. He retired from the Air Force in 1977 and spent 10 years in real estate in Norfolk, Va., before moving to Texas and beginning his writing career. He has written several plays, including "The Sesquicentennial Pageant," for Llano County, Texas, in 1986; "The Last of Rose Summer"; and "Siamese Twins," an award-winning comedy. He began writing his column, "It Happened This Way," in April 1997.

Playing by Professor Armstrong's Laws

The Alumni Magazine staff is to be commended for that wonderful 75th anniversary issue [Spring 1998] and also the space issue [Fall 1998]. They are real gems.

I have enjoyed the stories you have published by alumni about incidents that occurred during their Georgia Tech years. This prompts me to offer my own memories about a great institution where I spent four eventful and rewarding years, and which had such a profound influence on my life.

In September 1924, I caught a train to Atlanta to enroll as a freshman. I carried with me dreams of becoming an architect, and to show that I was a man of the world, my golf clubs—all wooden shafted in a white canvas bag. A fraternity rush committee met me at the station and took me to their house, where I met the one-and-only Bobby Jones, who had graduated from Tech just two years before in 1922. I knew that he also played with clubs with long wooden shafts (because there was no other kind then), but I don't think that he ever saw my golf sticks or knew that I also had visions of becoming a great golfer. It wasn't long before I found that architecture at Georgia Tech and serious golf did not mix. Those golf clubs stayed in that canvas bag most of my college career.

A lot of work was crowded into four years. I had also had four years experience working in an architect's office, which gave me a distinct advantage over my classmates. I completed the entire freshman drawing requirements in a few months, making the highest grades. My instructors were astounded because nothing like that had ever happened before. I got a job working in the afternoons as a draftsman for an architecture firm, when otherwise I would have been working on freshman design projects. I was paid well, but what was more important, I gained valuable experience.

When my wife, Helen, and I were
in Atlanta for my class reunion in 1978, we stayed at the Sheraton Atlanta Hotel on West Peachtree. I went out on the balcony that overlooked Spring Street and I had to laugh. Down the street was a building that I helped design as a freshman way back in 1925.

I pledged Sigma Phi Epsilon fraternity and stayed in the Knowles Dormitory [which has been replaced by the Bill Moore Student Success Center]. My roommates were Jake Lawo of Memphis, Tenn., and Red Wallace, a track man from Statesboro, Ga. Our room faced Grant Field, and we could look out our window and see practically everything that was happening on the field.

The Knowles Dormitory had been completely renovated. The high-ceiling rooms had been newly plastered, but the walls were left unpainted. On the door of each room was posted the dormitory rules—or as they became known, Armstrong's Laws, for Professor Arthur Armstrong was in charge of all the dormitories. Rule No. 9 stated that the walls should not be damaged by nails, screws, picture hangers or thumb tacks. This meant we would have to look at those stark white walls for the entire school year.

But one day there appeared on the wall a picture—not pinned, tacked or nailed, but pasted. I do not remember which of us did it, but it started a trend. Soon other pictures appeared on the walls.

As we made friends with freshmen from other dorms, we would invite them to visit our room. There were comments about what would happen when we got caught—which seemed inevitable.

Our friends began bringing their own pictures, and soon the walls began to be covered with best-girl pictures and pictures from hometown newspapers, magazines and Rotogravure sections of various Sunday papers neatly pasted on the wall. When there was no space left, the ceiling became the target.

We thought it was a beautiful room. Anyway, it was warm and different.

In the spring, the blow fell. The word of our picture gallery got back to Armstrong. My roommates and I received invitations to visit the awesome Armstrong. His secretary ushered us into his office and closed the door. Professor Armstrong, with a stern look, got right to the point. We were guilty of defacing the walls of our room. We were to remove the pictures immediately and report back for punishment.

When he finished, I asked Armstrong to see a copy of the rules. I read Rule No. 9 aloud.

"Professor Armstrong, sir, that rule does not say anything about not pasting pictures on the wall," I said. "It says not to use nails, screws, picture hangers and thumb tacks. We didn’t use any of those."

Armstrong sat there with his mouth wide open.

When school was over and the dormitory began to empty, all the walls were stark and white—except room 104. I hope Professor Armstrong’s curiosity got the better of him and he went to see the room. I believe he would have liked it.

Thomas F. Faires, Arch ’28 Scottsdale, Ariz.

Sideways Never Met a Stranger

The dog, Sideways, was such a celebrity to the Georgia Tech people of my era that I thought you might be interested in my remembrance.

My freshman and sophomore years, before entering the service, were 1944 and 1945. In those days, the Alpha Nu House was on the north side of North Avenue (between the Varsity and Grant Field). There were three or four rooming houses on the street, too.

A roofer moved off and left his dog at the house next to us. We operated a dining room at our house, so our cook started feeding the dog. Heavy traffic being what it was on North Avenue, the dog got hit by a car. After he recovered, he could still walk, but his front legs did not line up with his rear legs. He had a definite "sideways" walk.

This was totally a people dog who never met a stranger. He naturally started following us to the campus each day, but he always came home for his meals. In short order, other students started to notice this dog on campus that had a strange walk. I have no idea who named him "Sideways," but the name stuck. After a while, other students were feeding him so much during the day that he did not always come home. He was adopted by the whole school.

When I came back from the service, Sideways was a campus fixture. When he died, he was buried next to the old Post Office behind the old Administration Building with a proper marble marker. With all the campus changes,
Sideways is not forgotten. The marker is still there.

Johnson: War Years Bring Changing of Guard at Tech

When I was in the seventh grade in Washington, Ga., I determined that I was going to attend Georgia Tech, take chemical engineering and work for DuPont. That’s exactly what I’ve done. I retired from DuPont after 33 years.

The catalyst may have been a chemistry set I received as a boy. I liked chemistry and played with it. I always had some kind of experiment going on in the back of our house.

I came to Georgia Tech as a freshman in 1940. But in 1942, with our country at war, we went to school all year round. I finished in 1943 and served in the Navy. I returned to attend graduate school after the war, and Georgia Tech had gone through a big change.

Tech’s student population was only about 3,000 before the war. But after the war, the student population had jumped to 6,000. We had so many freshmen, some of them lived out in the old Navy Base in Chamblee. They held classes there, but would come to campus for labs.

The war years also saw a changing of the guard.

Dr. M. L. Brittain, a gentle man who could also be very firm, retired as president. He was succeeded by Col. Blake Van Leer.

Dean Vernon Skiles, another giant at Tech, died shortly after I returned. As an undergraduate student, I had Dean Skiles in a calculus class. He wore a hearing aid, and if the conversation drifted away from the lesson, he just turned it off. A student once complained about receiving a bad grade for missing a decimal point. Dean Skiles replied, “Young man, if you miss the decimal point, the bridge will fall down!” We once questioned Dean Skiles concerning the proper nomenclature of logarithms. He did not use the same symbols as the textbook. His reply was short, “I have been teaching it my way for 36 years, and this is how we will do it.”

On one occasion, an ROTC unit built a small cannon to shoot dummy shells at a paper target that bore the likeness of Tojo, the Japanese general. The target range was the length of Rose Bowl field. However, there was an error in the ballistics calculations and the shell landed in the O’Keefe school yard. Fortunately, it was not during recess. A call from Dean Skiles to the ROTC commandant ended that project.

Dean Skiles was known as the unofficial chairman of the Fulton County Draft Board. If you had a student deferment, and he felt your grades were unsatisfactory, one phone call and you were on the way to the Armed Forces. Dean Floyd Fields, the long-time dean of students—nicknamed “Billy Goat,” probably because he had a white goatee—was at many of the orientation lectures when I started as an undergraduate student. But when I returned as a graduate student, he was no longer there and George Griffin had begun his tenure as dean of students. Through all this change, I have always considered George Griffin a stabilizing influence.

Dean Griffin was the best friend of all Tech men. I met him early because I went out for his freshman cross-country team. The only race I ran was against Boys’ High. After finishing dead last, I told coach Griffin that I should quit. “No you don’t,” he said. “The exercise will do you good and keep you off the street!”

Our friendship continued the rest of his life.

I was visiting with Dean Griffin just before he retired as Dean of Students in 1964. While I was there, a young lady came in and repaid him $20, which probably was for bus fare. Then a student came in. “What do you want?” Dean Griffin asked in a gruff voice. The student said he had witnessed an automobile accident and the hearing had been set for the same time as his math final.

“To go down to the police station and tell Sgt. Jones that I said for him to change the hearing,” Dean Griffin commanded.

The last time I saw Dean Griffin he
was in his 90s and in a nursing home, propped up in bed reading a book about the World War II Solomon Islands naval campaign.

Dr. Jess W. Mason was a brilliant and caring professor. He was a department head at the age of 30 and a dean at 40. He had a phenomenal memory, and could do slide-rule calculations in his head. In 1966, I visited him at his home, having not seen him for several years. He looked at me and said, “Johnson, Washington, Ga., 25 years ago.”

He would prepare our schedules, assigning us to different sections of his class and on the first day he would call the roll from memory.

In the spring of 1947, Dr. Mason was “resting his eyes” in his office. Some of the graduate students saw him. They went down to the lower floor where many of them worked. One of the fellows called him on the phone, and, imitating President Van Leer said, “Jess, this is Blake. We all need to stay awake around here.” In a minute, Dr. Mason called downstairs and announced, “All of you guys are fired.” Happily, he did not carry out that threat.

I had the privilege of being the first of Dr. Waldemar T. Ziegler’s graduate students. I completed the work on my master’s thesis under his supervision in 1947. He was a true genius who had the ability to make complicated problems simple.

Professor John Lawrence Daniel was head of the chemistry department for many years. He was very demanding and always required our best effort. I took both quantitative and qualitative analysis under him. When I entered graduate school, there were no fellowships available in chemical engineering. Professor Daniel gave me one anyway, and I helped teach freshman chemistry lab. That year there were so many freshmen that Professor Daniel would hire any senior or graduate student in chemistry or chemical engineering who was willing to work. We ran both labs in Lyman Hall for three shifts every weekday and once on Saturday. It was a great experience for me, and having to make presentations every time was very helpful to me later in industry.

Georgia Tech taught me how to solve a problem. We learned how to look at the whole problem and how to think it out. It is a lesson that was taught to me by many very special people, and one I will not forget.

William Lloyd Johnson Jr.,
ChemE ’47, MS

The Summer 1998 issue of the Alumni Magazine showed a Marilyn Monroe picture on page 8 wearing a White and Gold [Georgia Tech sweater], which reminded me of a People magazine issue (early ’80s). It features Brooke Shields wearing a Georgia Tech Yellow Jackets football jersey. I thought I had saved it, but I couldn’t find it. Maybe you can.

Mark D. Rambeau, IE ’84
Atlanta, GA 30327

The photo appeared in the August 10, 1981, issue of People. Brooke Shields’ publicity agent said the jersey was a gift from an admirer “and she really does like it.”

Stylish Brooke Shields

The Times, They Are A-Changin’—and How

Many alumni returning to campus for Homecoming must have noticed the change that is taking place at Georgia Tech. To be sure, there are boundaries, yet the environment surrounding the campus reflects change. To the east is the I-75, I-85 interstate connector and a subway line. To the north, Home Park. To the west, a run-down industrial area. To the south, Techwood.

Techwood went from being the nation’s first public housing for middle-class folks to being a dangerous area, both for its inhabitants and its rare visitors. It is now the site of new townhouses and apartments, and a new YMCA and elementary school that just opened (the school has high speed Internet access, thanks to Georgia Tech).

This housing complex now separates Georgia Tech from Centennial Olympic Park, the Georgia World Congress Center, the CNN Center, the Georgia Dome, and the soon-to-be-built home for the Atlanta Hawks. What is now within walking distance of campus was barely dreamed of a generation ago and (for the places that existed) was unreachable by foot a mere three years ago.

West Campus—as we know it—used to be part of the mill village for Atlantic Steel. In addition to the small 70’s-style dorms, Tech now has 2000 new beds in apartment-style dorms (all with ethernet hookups), a late-night hang-out and digital recording studio, a new parking deck with a diner, a convenience store and more basketball courts. Atlantic Steel is about to be developed into a large entertainment complex and technology park with an apartment complex thrown in for good measure. Between the dorms and Atlantic Steel we have
the new, super-high-tech GCATT building (each of the more than 200 seats in the main hall has an ethernet connection and two power ports), the new Graduate Living Center, the Tech softball fields, and soon-to-be-overhauled Home Park.

Tech used to be a regional school of white males. Now it is now highly ranked for the number of minority engineers that graduate. The percentage of our students who are women continues to climb. All three of Tech's Truman Scholars have been women, and two were African-American.

The number of cultures at Georgia Tech is represented by the flags that fly in the Charles Smithgall Student Services Building, which is part of the Dean George C. Griffin Student Complex (along with the Robert Ferst Center for the Arts and the Fred B. Wenn Student Center). The Callaway Student Athletic Complex is a long stone's throw from the Dean Griffin statue. Few of these buildings were here before I started at Tech in 1990.

The application for undergraduate admission now includes two pages for activities, sports and leadership, and room for an essay. This information will now be used in conjunction with standardized test scores and high school academic performance to determine which students are admitted to Georgia Tech. Because of these changes, Tech's top merit scholarship is now much more inclusive, as the artificially high test score cut-off has been eliminated.

Students interested in Georgia Tech's rewards, value and reputation now have several more choices for majors, double majors, minors and certificates. The Ivan Allen College, in particular, is growing rapidly. Even non-Georgia residents are beginning to select International Affairs; Science, Technology and Culture; and History, Technology and Society as their majors, and they will soon be able to add Public Policy to that list.

On bright, sunny days, these students will congregate on the shaded steps near the Kessler Campanile and its fountain. They will be drinking expressos or slushees from the CyberCafe in the Frank K. Houston Bookstore Mall, which now includes a Hair Cuttery, College Optical and an expanded convenience store, along with the BuzzCard (student ID/meal card/key card) office.

Students now register for classes online using a Web interface, and select their dorm rooms the same way. Before they register for classes, they can check the online course critique (and possibly submit a few evaluations while at the site). "Word" for these classes is available, not just through the vault in a fraternity house, but again, online (or at the Library, for the Web-challenged). How do you know the word will be available? The honor code guarantees it, thanks to student initiative and faculty approval.

Clearly, this is not your father's Georgia Tech.

Randolph McDow, IE '95
Georgia Tech

Passion for Space

You've hit another one out of the park with the Fall 1998 Space issue of the Alumni Magazine. I read it from cover to cover in one sitting.

However, not all Georgia Tech alumni with a passion for space exploration are astronauts or make their living in that field. Many of us are involved in membership organizations that bring space enthusiasts together and promote space development through education, community outreach and grassroots lobbying efforts.

For example, there are many Tech alumni active in the National Space Society <www.nss.org>, whose mission is to promote a spacefaring civilization—one in which people routinely live and work in space.

NSS has many chapters, including one in Atlanta <www.offworldsolutions.com/nssatl> which sponsors monthly lectures at Fernbank Science Center. I encourage all Tech alumni with an interest in space science and exploration to get involved—you don't have to be an astronaut to make a difference.

Jerry Samples, Phys '86
Marietta, Ga.

Horse Course Elective

In response to the "Horse Sense" article in the Fall '98 TechNotes, I appreciate the cost of a college education. I am the wife of a 1962 master's degree graduate, and mother of a 1983 graduate. I am also a professional horseman and a Purdue University graduate.

In 1898, a horse was a very necessary part of life. The cost was a real necessity. Today, the fees for ownership are no more than that of a boat, airplane or high-level sports equipment.

But a horse is not just a frivolous expense. The horse provides self-esteem, physical therapy, psychological uplift and dedication to a living being that teaches self-control and responsibility. And, yes, a horse is a source of recreation. This fills free time and provides diversion from less wholesome activities. Attending a football game is great social activity, but hardly comparable.

Perhaps we should recommend that horseback riding be a suggested activity for Georgia Tech students. The cost looks like a bargain to me!

Martha Aitken
The Long Grey Line Farm
Huntsville, Ala.
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The 12th-ranked Yellow Jackets took a bite out of the Georgia Bulldogs for the first time in eight years this past November as Brad Chambers capped a fourth-quarter comeback with a winning field goal.

Linebacker Delaunta Cameron (above) celebrated by taking a bite out of the legendary hedges at Georgia's Stanford Stadium. The Jackets trailed 19-7 going into the fourth quarter, but quarterback Joe Hamilton (right) led Tech down the field for three scores, including a two-point conversion. "This is the best game we've ever won," said senior Charlie Rogers. "Nothing compares to this. Nothing!"
A study by Georgia Tech and Emory University to determine whether the oriental practice of Tai Chi improves the quality of life for elderly people will be featured on Public Television this month.

The study, conducted under a grant from the National Institute on Aging, will air as part of the holistic health series "Body and Soul." Researchers are analyzing the movements of study subjects from 20 different congregate living facilities to determine if Tai Chi can improve movement control and reduce the danger of falls among older adults.

The 14-person team conducting the study is headed by Robert Gregor, head of the Department of Health and Performance Sciences at Tech, and Steven Wolf, Emory’s director of research for the Department of Rehabilitation Medicine.

As part of the study on Tai Chi’s effect on older adults, Bob Gregor’s team used light sensors to record movements.

The Dean Quest

Ivan Allen, DuPree Colleges Advance Search for Deans

Search committees for deans of the Ivan Allen College and the DuPree College of Management are advancing their searches and both colleges expect to interview candidates early this year.

The Ivan Allen Search Committee, chaired by economics professor Danny Boston, began formal screening of applicants in October and expects to host campus visits by candidates in mid-January. The committee hopes to recommend finalists for the office to Provost Mike Thomas by mid-February.

Information about the Ivan Allen search is on the Internet at: <www.iac.gatech.edu/deans_search>.

The DuPree search committee, headed by Mechanical Engineering Chair Ward Winer, has begun receiving applications and is close to an agreement with a professional search firm which will assist in their search process. The committee expects to recommend finalists by spring.

Complaints, Please

Got a problem? Something wrong? The Georgia Tech Student Government Association has opened a complaint department in cyberspace. The address says it all—students are invited to vent their frustrations at: gripes@sga

Uneasy Listening

Is it the cutting edge of musical evolution or cultural commentary? The Student Center listening room has added the following new releases to its playlist: Zoot Suit Riot, Big Bad Voodoo Daddy, Aversion to Footwear, The Bends and Refried Food.
Unlimited Designs
Tech work featured in national exhibition

Designs by Georgia Tech’s Center for Rehabilitation Technology share the stage this winter in a special exhibition at the Smithsonian Institution’s New York museum.

Among the four original designs being featured in the institution’s Cooper-Hewitt National Design Museum in New York City are a new “Autumn Chair” and a “Supine Workstation.”

The exhibit, “Unlimited by Design,” will showcase more than 200 products, services and environments at the forefront of “universal design”—a design conceived to enhance the routine activities of the greatest number of people, embracing a wide spectrum of abilities and age groups.

“This exhibition, lasting more than six months, will help CRT become recognized as a national center for design,” Center Director Joseph Koncelik said. “Georgia and CRT are at the forefront of serving the needs of people with disabilities, and the ‘Unlimited by Design’ exhibition will be a step in demonstrating our leadership to the nation.”

The Autumn Chair is designed for an elderly person, reducing the discomfort of arthritic knees and improving balance. The Supine Workstation is aimed at people with pain or posture problems who are required to remain seated for long work hours.

CRT will also display its adapted “Binder Levers,” plastic levers that fit over the metal opening tabs of notebook binders to make them easier to open for people with a weak grasp or pain from conditions such as arthritis. At the opening of the exhibition, the Road Scholar, a mobile computer lab that uses technology to increase adult literacy, will be on display.

The exhibition opened in November and runs through March 21, 1999.

Living Laboratory
Tech unveils $4 million facility for sustainable technologies

In its ongoing thrust toward sustainable technologies, Georgia Tech dedicated a new, 30,000-square-foot Sustainable Education Building (SEB) at 790 Atlantic Drive. The $4 million facility will serve as a “living laboratory” for the education, research and application of sustainable technologies.

“This facility will further enhance the College of Engineering’s leadership in the areas of environmentally conscious design and manufacturing and in sustainable technologies,” says Dean of Engineering Jean-Lou Chameau.

The SEB will house a multimedia theatre for distance-learning activities; an electronic resource center for students and professionals; sustainable technology exhibits; and research labs, computer centers and offices for the School of Civil and Environmental Engineering.

Like many of Georgia Tech’s new facilities, it will also contain a business incubator for the transfer of emerging technologies from the lab to the marketplace.
Launch Control

Lyons directs "national hero" Glenn's second send-off into space

Georgia Tech alumnus and NASA engineer Douglass Lyons, ME '88, was the test director for the Discovery shuttle launch Oct. 29 that returned 77-year-old John Glenn to space for a nine-day mission. A report in the Miami Herald noted that Lyons "coordinates all ground operations and stays in touch with the crew. If something goes wrong, he can recommend a halt in the countdown."

Happily, all went well from liftoff to touchdown for Glenn and the other six crew members.

Lyons once had aspirations of becoming an astronaut himself, but while taking deep-sea fishing trips with his father, also named Doug, he discovered he was subject to motion sickness and "had to find another way."

The younger Lyons received a tentative appointment to the Naval Academy, but because of the motion sickness, he elected to attend Georgia Tech—following in the steps of his late grandfather, Edward Eugene Lyons, Cls '28, who had a 45-year career with Florida Power and Light Co. After graduating with honors, Lyons was hired by NASA just as the agency was resuming shuttle flights following the 1986 Challenger disaster.

"It was my dad's dream that I would go to Tech," says the elder Lyons, a Miami insurance agent. "That didn't work out. But my son, Doug, has always been interested in engineering. He's been in the shuttle program the entire time he has been at NASA."

Lyons has been test director of four other shuttle launches, but the John Glenn mission was exceptional.

Glenn is "a national hero," Lyons says. "I'm very proud to be part of the team that's launching him back into orbit."

75 Years Ago—A 500-watt radio station known as WBBF, a gift from Atlanta Constitution editor Clark Howell to Georgia Tech, receives an FCC license to operate. Intrigued by Tech's early radio experiments, Howell donated the station, which operated out of the electrical engineering department. A few years later, the station received the call letters WGST (Georgia School of Technology).

50 Years Ago—A campus institution turned 50 in November with no sign of slowing the slinging. Junior's, the longtime student-friendly eatery that moved onto campus to make way for Olympic development, entered its 50th year Nov. 19 with typical flair: cheap burgers and fries. Students, faculty and staff enjoyed $1 burger baskets and commemorative t-shirts with Tommy Klemis (above), who now runs the joint in the site of the old Robbery, next to the Tech Tower.

25 Years Ago—Veteran NBC news commentator David Brinkley fielded questions at a Georgia Tech press conference before addressing a standing-room-only audience. Asked if he thought President Richard Nixon would serve out his term, Brinkley replied, "Assuming nothing else of an explosive nature occurs, I expect him to serve out his term. He won't resign. Why should he? Then he'd have to pay his lawyers' fees himself."
In an era before the term "flexible" really applied as a career style, Howard Ector perfected it. A football hero, student leader and World War II pilot, Ector was the first chief administrator of the Georgia Tech Foundation, an executive director of the Georgia Tech Alumni Association, and business manager of the Athletic Association during coach Bobby Dodd’s golden era. All of that before embarking on a banking career.

During fall quarter graduation exercises Dec. 12, W. Howard Ector Jr., IM ’40, was awarded the 1998 Joseph Mayo Pettit Alumni Distinguished Service Award. The award was begun in 1934 as the highest honor an alumnus can receive from Georgia Tech.

Ector stepped onto Grant Field in the mid-1930s as a walk-on and became an all-Southeastern Conference quarterback his junior and senior years—engineering the Yellow Jackets’ SEC championship in 1939 and a New Year’s Day Orange Bowl victory over Missouri. He was also senior class president and a member of ANAK, Omicron Delta Kappa and the student council.

He was the first executive secretary of the Georgia Tech Foundation in 1947, and helped launch the Georgia Tech Alumni Association Roll Call drive. In 1951, Ector became executive director of the Alumni Association, and in 1952, he was named business manager of the Athletic Association.

In 1959, Ector joined Trust Company Bank. He retired 23 years later as a vice president and began a career as a senior vice president of Georgia International Life Insurance Co., retiring again eight years later.

Ector is a past president of the Georgia Tech Alumni Association and a member of the Georgia Tech Athletics Hall of Fame. In 1992, Ector received the Marietta, Ga., Citizen of the Year Award, and in 1995, he received the Dean George Griffin Community Service Award in recognition of a lifetime of civic and community involvement. In 1994, the class of 1940 established an endowment for the W. Howard Ector Outstanding Classroom-Teacher Award.
Out-of-this-World Study

Alumni magazine proves to be a learning resource for youngsters in Douglas County, Ga.

As an educator in Douglas County, Ga., I was pleased to see your beautiful Fall 1998 issue featuring "Space," wrote Colleen Hunt, a teacher at Factory Shoals Elementary School.

Fourth-grade pupil Lauren Garcia, daughter of Obe Garcia, IM '80, took the magazine to school because it fit with the class study about the planets, space exploration and astronaut John Glenn's return to space.

"It was circulated through each classroom and got a little ragged on the edges," said Mrs. Hunt, who inquired about overrun copies for other students in the class. The Alumni Magazine staff was happy to supply the extra copies. The more than 100 students in three different grade levels at the school also wrote letters to President Clinton urging him to provide strong support to NASA and the space program.

Bioinformatics First of Its Kind

New master's program starts with fall semester

Georgia Tech is creating a new master's program in "bioinformatics," slated to start next fall, that is being tagged a science of the next millennium. According to the 1999 edition of the Kaplan/Newsweek guide "How to Choose a Career and Graduate School," it's also the first such program of its type in the United States.

"Bioinformatics is a science of the 21st century," says Mark Borodovsky, a professor in the School of Biology who will head the new program.

Bioinformatics integrates mathematical, statistical and computer systems to analyze biological, biochemical and biophysical data. The bioinformatics lab at Tech currently is developing computer methods for statistical analysis, modeling and pattern recognition of DNA and proteins.

Graduate students in the program are expected to find many opportunities to apply bioinformatics training as quantitative and computer methods become more important in drug design and other data-rich biological areas.
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
Noting the unexpected success of the Campaign for Georgia Tech in its first three years, Georgia Tech Foundation trustees voted in their December meeting to raise the campaign goal to $500 million.

Speaking for the National Campaign Steering Committee, Chairman Pete Silas recommended the $100 million increase and stressed that the campaign leadership must "maximize our potential during this campaign period to meet the expanded needs of the Institute and its programs." Silas, the retired chairman of Phillips Petroleum, said the campaign has already gone over its initial goals in several areas, but there is no shortage of Institute needs. In addition, the campaign continues to run more than a year ahead of schedule, and there is significant evidence to suggest there is more to come.

"At a half-billion dollars, we're entering the big leagues," said Silas, ChE '53. "You can count the public universities at that threshold on two hands. And they count their alumni in the hundreds of thousands."

Specifically, the additional $100 million will:

- raise the College of Computing's goal to $20 million from $10 million;
- add $10 million for the College of Engineering to enhance the new Georgia Tech/Emory Department of Biomedical Engineering and for general purposes;
- raise the College of Science's goal to $25 million from $20 million;
- raise the Ivan Allen College's goal to $15 million from $10 million;
- raise the goal for athletics to $75 million from $50 million;
- raise the goal for Institute-wide restricted support to $60 million from $25 million, including $15 million for student life and $10 million for the Library; and
- raise the goal for unrestricted support to $60 million from $50 million.

"The increase is the logical outcome of our success," said President Wayne Clough, CE '64, MS CE '65. "There are two years left in the campaign, and they look every bit as bright. The Institute deserves nothing less."

Georgia Tech Foundation President Julian LeCraw said increasing the goal during the roll out of the campaign's public phase "signals to everyone that their gift will indeed make a difference."

"Nobody anticipates it's going to be easy. It's going to take everyone's involvement to get there. But it's achievable."

Larry Gellerstedt Jr., campaign vice chairman, said, the "college- and school-based distributed model has taken hold. The faculty are integrally involved. The regional efforts are already paying rich dividends. And there's room for another look at the goal a year from now. Our aspirations are high."

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Industries of the Mind
The Next Wave of Economic Opportunity

By Bob Harty
Photography by Gary Meek

In the early days of American development, towns and cities sprang up from places blessed with abundant natural resources, places accessible to the transportation technology of the time. Water was the first priority, and along waterways sprang cities like Pittsburgh and Chicago.

Next came overland transportation and the westward movement that grew towns like Denver. The Industrial Revolution spawned new ways to move people and products. Railroads stimulated growth at their junctions. Cities such as Nashville and, of course, Atlanta sprang up at these crossings.

The industrial economy that grew these cities also spawned whole new industries in manufacturing, in textiles, in agriculture, and energy; they produced value primarily through the ownership of property and lowering the cost of skilled labor.

But as General Motors yields to Microsoft, the world is entering a new economic revolution, one which will inalterably shape Atlanta and select other cities. It is the development of a new high-tech frontier—this one sweeping west to east, seeking human capital, venture capital, intellectual capital and critical mass.

It is from this electronic frontier that arise the new "industries of the mind" and the cities—like Atlanta—that embrace them.
Helping Georgia prepare for a high-tech economy means doing what Tech has always done best—providing a rigorous and relevant, technologically based education.

Into the Millennium

According to Bill Todd of the Georgia Research Alliance, the top five states in high-tech employment are California, Texas, Massachusetts, New York and Illinois. But Georgia is closing in, growing high-tech jobs faster than any state in the nation. Professor Donald Ratajczak of Georgia State University estimates that Atlanta is home to more than 100,000 high-tech jobs, more than 7 percent of the metro-area employment.

It's an accomplishment achieved through solid investment in the high-tech infrastructure of Atlanta and the state. And Georgia Tech has been at the center of it.

But to continue to compete and succeed in developing, maintaining and attracting high-tech industry will require a nimble and cooperative approach between the public and private sectors. To succeed, Georgia must create, nurture and maintain its most valuable asset—people—and the intellectual property, intellectual capital and tools that workers in knowledge industries use.

Start with technology pioneers like Scientific-Atlanta, CNN, BellSouth and MindSpring; mix in fiberoptic infrastructure created for the Olympics; combine with a growing interest in Georgia by venture capitalists; and blend in the resources of Georgia Tech. You have a brew that is reaching critical mass.

Project Yamacraw

Now is the time for Georgia, with substantial help from Georgia Tech, to take this effort to the next level. Enter Project Yamacraw, a proposed initiative that could have a profound impact on whether or not Georgia—like Silicon Valley, Austin, Raleigh/Durham and Washington—will become a true pioneer site for the industries of the mind.

The goal of Project Yamacraw is to make Georgia the epicenter for electronic design in the United States, growing more indigenous businesses and attracting major companies to the state. Specifically, Project Yamacraw intends to attract 10 new companies and a substantial number of new engineers to Georgia.

Georgia Tech will be crucial to the success of this effort. While the project requires legislative approval, it has the enthusiastic support of Gov. Roy Barnes, and plans are already under way to make Georgia's high-tech infrastructure the most attractive of any state in the nation. Preliminary plans call for increasing the number of computer engineering and computer science graduates at Georgia Tech and throughout the University System, establishing a Georgia Electronic Design Center, developing an Intellectual Capital Mart and recruiting relocated Georgia Tech graduates back to Georgia.

As Georgia prepares for an economic revolution, it again looks to Georgia Tech for vital assistance. Helping Georgia prepare for a high-tech economy means doing what Georgia Tech has always done best—providing a rigorous and relevant, technologically based education that teaches people to think critically, act decisively and live responsibly.

This issue is devoted to Georgia Tech's part in growing a high-tech economy: the people, the research, the infrastructure and the strategy behind our continual efforts to add value to the state through teaching, research and economic-development outreach. It reflects a portion of what Georgia Tech is doing to continually improve the state's position as a growing high-tech power and, in the long run, continue Tech's trajectory into the top echelon of technological universities in the country. GT

Bob Harty is the director of Georgia Tech's Office of Communications and Public Affairs.
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Atlanta's march toward a high-tech economy began more than a century ago, in the ashes of Sherman's march to the sea. "Some of the stories that we tell today are remarkably similar to what Atlanta newspaper editor Henry Grady was talking about with such passion and eloquence in the 1880s," says William J. "Bill" Todd, IM '71, president of the Georgia Research Alliance, a private nonprofit group that funnels high-tech investment funds to university researchers.

"The cornerstones of his 'New South' philosophy were industrialization, racial reconciliation and reconciliation with the North—and the key to industrializing was developing a pool of engineers," Todd says. "Georgia Tech was founded in 1885 for that purpose—to create a pool of talented engineers to move us from an agrarian to an industrial society."

It's taken about a century, but the seeds Grady planted are flourishing now in a hothouse of university incubators where entrepreneurs are hatching start-up companies by the hundreds. West Peachtree Road near the Tech campus has become a high-tech corridor, packed with start-ups wanting to stay close to Tech researchers and each other. Private investors are putting their money where the word-of-mouth is—staking millions on fledgling companies, even just good ideas.

The surge of start-ups is even amazing some of those who made it happen. "I'm real pleased with it, but I must confess some surprise that it happened as quickly as it has," says former Gov. George Busbee, who wouldn't let state legislators laugh off the idea of "incubating" fledgling companies at Tech. Todd produces the statistics:

- High-tech industries now employ about 150,000 people in metro Atlanta, Todd says. That's about the same as the city's predominant convention industry—but paying wages nearly three times higher.
- Georgia cracked the American Electronics Association's Top 10 list of states with the highest number of high-tech jobs in 1996. It's stayed there since.
"Basically, we help companies to be more profitable and find solutions to their problems."

Metro Atlanta snagged $340 million in venture capital in 1997, catapulting Georgia into the top 10 states in an annual survey by accounting firm PricewaterhouseCoopers—ahead of North Carolina and Florida for the first time.

The strides have come by focusing on two niche markets within high-tech: telecommunications and small start-ups. That sets it apart from other Southeast competitors. For example, North Carolina’s Research Triangle focuses on high-tech manufacturing for industry giants such as IBM. Huntsville, Ala., lures defense technologies. Orlando, Fla., concentrates on laser-based technologies. Internet-based companies cluster around Richmond, Va.—although several Atlanta companies now are making inroads on that turf.

The latest, and largest, burst of activity came in the wake of the 1996 Summer Olympics, which left Atlanta wired with more fiberoptic cable than any other city in the world. The Metro Atlanta Chamber of Commerce began luring companies here to take advantage of that.

But the Chamber’s success in that campaign, still ongoing, was really the cherry on top for decades of slow, often unrewarding spade work—much of it done by groups and individuals affiliated with Tech.

The 1950s

The Georgia Tech-affiliated Economic Development Institute (EDI) opened its first regional office about 40 years ago in Rome, Ga. Since then, it has opened 18 more field offices around the state, all offering the expertise of staff engineers to companies and entrepreneurs in their region.

“Basically, we help companies to be more profitable and find solutions to their problems,” says Director Wayne Hodges, who also serves as a liaison to the Georgia Research Alliance. "We may be able to resolve it at the field level; we may send it on up to Georgia Tech to experts there, or we may be able to bring in another agency or group in the state with a particular capability to help.”

Much of EDI’s work is, and was, high-tech, Hodges pointed out—but in industries where that phrase isn’t used much. State-of-the-art, high-tech manufacturing processes roll out miles of cable at Southwire Corp. in Carrollton, Ga., for example—but that’s not considered a high-tech company because its end-product is simply wire, not computers or software. The same holds true for the textile industry.

So regional offices help
low-tech companies adopt technology to compete in the world—including information technology, quality and international standards, and lean manufacturing techniques.

"Their production processes are high-tech," Hodges says. "That's how they compete."

EDI, which also manages Tech's technology-transfer activities and economic development programs, was created in 1992. The regional offices got their start under the industrial extension service of the Engineering Experiment Station, which became the Georgia Tech Research Institute in 1985.

"EDI was spun out of GTRI because what we do is outreach and not applied research," Hodges explains. "Although we are separate, we work very closely with GTRI."

In 1951, the state's landmark high-tech company, Scientific-Atlanta, opened its doors—founded by seven Georgia Tech professors: Glen R. Robinson Jr., James E. Boyd, Robert E. Honer, Vernon Widerquist, Lamar Whittle, and Charles and Gerald Rosselott. A small manufacturer of electronic test equipment for antennas used in the space and defense industries, chairman Robinson, Phys '48, MS Phys '50, and colleagues traveled up and down the highways of the East Coast selling their equipment to military bases.

As the company grew into a world leader of satellite-based communications networks, cable-television electronics and telecommunications applications, it hired more and more Tech graduates—many of whom ultimately followed Robinson's entrepreneurial example and set out on their own. About 100 of Atlanta's high-tech companies can trace their roots to Scientific-Atlanta.

The 1960s

Television cameras never captured Atlanta policemen with riot batons and German shepherds wading into crowds of civil rights marchers—unlike what happened in Birmingham, the Alabama city that was Atlanta's rival for southeastern dominance at the time.

"There's no doubt that peaceful social change, led by a number of people, including then-Mayor Ivan Allen Jr. [Com '33], played into Atlanta's development," Todd said. "When I was growing up, Atlanta and Birmingham were considered about the same—real competitors."

The civil rights movement coincided with the decision of many Fortune 500 companies to establish regional offices around the nation, Todd said. Many northern executives, shocked by the violence, simply refused to move their families to Atlanta's skyscrapers dwarf the Tech tower, but it's been the Institute's development of intellectual and entrepreneurial ventures that has spawned much of the city's success.
Dr. Joseph Mayo Pettit, president of Georgia Tech from 1972 to 1986, brought to Atlanta both familiarity with Silicon Valley and a wealth of personal experience.

They said, 'We'll go to Atlanta, but not to these other places that have suffered daily newspaper coverage of terror and unrest,'" Todd said. "That's how Atlanta got the very strong presence of AT&T and IBM, many of whose executives are the backbone of the technology industry. "Doing the right thing paid off handsome dividends, royally."

Four Tech graduates founded Atlanta's first software company, Management Science Atlanta (MSA) in 1963. A few years later, MSA would change its name, substituting "America" for "Atlanta." As happened at Scientific-Atlanta, many MSA employees went on to create their own companies. Two MSA founders, Jim Edenfield, IE '57, and Tom Newberry, IE '54, MS IE '58, Ph.D. '61, later left to start another Atlanta company, American Software.

When MSA fell on some hard times in the late '60s, another Tech grad, John Inlay, IM '59, took the company through bankruptcy proceedings and a painful reorganization. And in 1972, the firm was showing a profit. Inlay emerged as a congenial leader and high-tech spokesman who cultivated an esprit de corps at MSA, empowering some southern cities, including Birmingham.

"They said, 'We'll go to Atlanta, but not to these other places that have suffered daily newspaper coverage of terror and unrest,'" Todd said. "That's how Atlanta got the very strong presence of AT&T and IBM, many of whose executives are the backbone of the technology industry. "Doing the right thing paid off handsome dividends, royally."

In 1971, Technology Park/Atlanta was incorporated, and two years later construction crews broke ground on the development in the city's northern exurbs. Paul Duke, ME '45, EE '46, was chief promoter of the project, modeled after a successful development at Stanford University, and all of the investors were Georgia Tech alumni. But before Technology Park/Atlanta achieved critical mass, a real-estate recession hit the city and the project was in jeopardy.

Michael Tennenbaum, EE '58, became chairman during the crisis, and Charles Brown, BC '62, was named president. The organization's directors personally guaranteed a bank loan that financed continued construction, while Brown began recruiting tenants. Technology Park has become home to a number of high-profile, high-tech companies, including Scientific-Atlanta, General Electric, EDS Nuclear and Digital Communications Associates.

In 1971, Parker H. "Pete" Petit, ME '62, MS EM '64, an aircraft engineer who lost a six-month-old son to Sudden Infant Death Syndrome, quit his job and founded Healthdyne in Marietta, Ga., where he developed the first home device to monitor infants at risk for SIDS.

Tech grad Dennis Hayes, Cls '73, and a co-worker at National Data Corp. built at Hayes' kitchen table in 1977 the first modem that could be used on a personal computer. Within eight years, Hayes Corp. would control 60 percent of the world's modem market.
In 1972, Dr. Joseph Mayo Pettit became president of Georgia Tech, leaving his position as dean of engineering at Stanford University. He brought to Atlanta both familiarity with Silicon Valley and a wealth of personal experience. A graduate of Stanford and a member of its faculty for 25 years, Pettit had been a major participant in the high-tech research and development boom that exploded around the Stanford campus. He became a chief proponent for high-tech development in Atlanta.

At the same time, a group of young Tech alumni living in Atlanta were taking matters into their own hands. The "Committee of Twenty," an adjunct committee of the Georgia Tech Alumni Association that was formed to keep young alumni active in campus affairs, decided the best and most obvious way to allow Tech graduates to remain in Georgia was to provide good jobs for them.

They did it, with help from President Pettit and one young lawyer willing to gamble with his personal American Express card. After graduation, John Hayes, IE ’70, worked on economic-development projects for Sen. Herman Talmadge (D-Ga.), attended Emory University law school, set out his shingle with an Atlanta law firm and joined the Committee of Twenty. In 1977, with Ben Dyer and several other friends from Tech, Hayes founded Peachtree Software, which grew to national prominence after developing software for IBM personal computers. But they got a firsthand introduction to how difficult life was for start-up companies in a town where neither bankers nor

**Venture Capital**

In 1980, when a group of young Georgia Tech alumni led by John Hayes organized the first venture-capital conference in Atlanta, there was no venture capital to be found in Georgia.

Since 1995, however, Atlanta has led the Southeast in attracting venture capital—money investors pump into a developing company—drawing more than $413 million in technology deals, according to PricewaterhouseCoopers.

Although Atlanta attracted only 3.3 percent of the U.S. high-tech venture capital during that time, the city has grown faster than top technology hot spots such as Silicon Valley; Boston; Colorado’s Denver/Boulder area; Austin, Texas; and Research Triangle Park in North Carolina.

Despite this year’s July-September stock-market plunge, at the end of the third quarter Georgia was on pace to out-perform its 1997 record of $290.2 million in venture investments.

Companies at Tech’s Advanced Technology Development Center have attracted an estimated $88 million in investments, mergers and acquisitions since December 1997. In all, seven ATDC companies received equity investments totaling more than $22 million, and six ATDC companies were acquired for approximately $66 million.

Atlanta venture-capital firm Alliance Technology Ventures has invested in four ATDC companies over the past two years.

"At Alliance Technology Ventures, we only invest in high-tech companies, so ATDC is a terrific hunting ground for us," says General Partner Stephen Fleming, Phys ‘83, who adds that ATDC’s formal review process ensures the quality of companies in the incubator. "If a plan makes it through the ATDC screening process, we’re almost automatically interested in taking a look at it."

Among the many Georgia Tech alumni excelling as venture capitalists include:

Charles Moseley, IE ’65, a partner of Noro-Moseley, one of Atlanta’s leading venture-capital firms. Founded in 1983, it is one of the city’s oldest.

Brook Byers, EE 68, a partner Kleiner, Perkins, Caufield and Byers of Menlo Park, Calif. He has been a venture-capital investor since 1972 and has been involved in more than 40 new science-based companies—more than half of which have become public companies.

Gil Amelio, Phys ’65, MS Phys ’67, Ph.D. ’68, a partner of the Parkside Group of San Francisco, leads his company’s high-tech financing.

Michael Tennenbaum, IE ’58, who founded Tennenbaum & Co. after nearly 20 years as one of Wall Street’s most important players in Los Angeles, where he ran the West Coast investment banking operations of Bear Stearns & Co.

E. Roe Stamps IV, IE ’67, MS IE ’72, a founder and managing partner of Summit Partners of Boston. Since its founding in 1984, Summit has been the fastest growing private investment firm in the country.
accountants, marketers nor lawyers understood the computer business.

In 1978, the Committee of Twenty sought advice from Pat Lyles, a Harvard Business School expert in entrepreneurship who had once worked in Atlanta for Scientific-Atlanta.

John Hayes recalls Lyles telling them: “You’ve got all the right ingredients, but they’re not quite ripe. They’re not close enough together to create the right climate, the right critical mass. You’ve got Georgia Tech, a great technological university. You’ve got people with a real entrepreneurial spirit, but they’re all doing real estate, not high tech. You’ve got very conservative banks who all want to be doing more, but don’t know how to do it. You’ve got law firms and accounting firms that want to help, but don’t have a clue how to do it. The best thing you could do to create 1,000 new high-tech firms is to fire all the engineers working in research at Tech, so they’d all go start their own businesses.

“The reason high tech was working in Silicon Valley and Boston and not so much in Atlanta was role models—people in Silicon Valley and Boston had examples.”

The Committee of Twenty began work on an innovative concept—to create an incubator on the Tech campus, which would rent high-tech entrepreneurs office and laboratory space at low cost and provide a network of business and technical advisers.

Top state education officials took the incubator idea to Gov. George Busbee. He had, it turned out, been looking for ways to bring advanced technology to Georgia.

“I wanted to provide a more diversified economy, to have more career opportunities for Georgians,” Busbee says. “But we had a lot of skeptics about getting the funds approved by the Legislature—and even in the business community—about whether you could take an incubator company and really make anything out of it.”

Busbee refused to let the idea die, including money for it in the budget he sent to the 1980 General Assembly.

Meanwhile, on the venture-capital front, John Hayes and a few others were struggling to set up a venture capital conference that would introduce the owners of start-ups to the owners of big bucks. They had just $100, from the Committee of Twenty.

John Hayes tried to win the sponsorship of a group that put on a similar conference in Silicon Valley. Not interested, they responded; this won’t ever happen in Atlanta.

Hayes charged the invitations to his law firm, hoping his managing partner wouldn’t mind too much. He charged the rental of conference rooms at the Atlanta Hilton on his personal American Express card, “in the great hope that the conference would at least break even,” he recalled almost 20 years later.

But entrepreneurs wouldn’t come without knowing which venture capitalists had signed up; venture capitalists wouldn’t come without knowing which entrepreneurs had committed.

John Hayes went to Pettit, who told him to invite a venture capitalist in California. He did, and the man agreed to come. Other venture capitalists followed, with alacrity.

Surprised at the turnaround, Hayes asked who that first venture capitalist was. It turned out to be Tommy Davis of the Mayfield Fund, the “dean of California venture capital,” the investor who had made much of Silicon Valley possible—and reaped many fortunes in return. Pettit had worked for him while a graduate student, steering him to several good buys.

Still, the clock was running. Silicon Valley was a stunning success. MIT in Boston was spawning a similar high-tech corridor. All the new high-tech companies wanted to be part of that synergy. Atlanta would just have to grow its own industry.

The 1980s

Things were looking good in the early 1980s:

- The 1980 General Assembly gave Gov. Busbee $185,000 to create his incubator, the Advanced Technology Development Center, which opened on the first floor of an abandoned high school on the Tech campus.
- After a strong push from Pettit, Tech’s research program had grown six-fold: to $45 million from $8 million.
- Fifteen high-tech firms and 60 venture capitalists showed up for John Hayes’ first high-tech venture capital conference, in May 1980. He did break even, by charging the investors just $200 to attend the two-day event. Several others would follow.

The conferences brought venture capital to Atlanta, but in a trickle instead of the hoped-for flood. Atlanta banks remained skeptical. But success came with a twist: Some of the people involved in luring venture capitalists here became so convinced of business potential in Atlanta that they left their jobs and set up their own venture capital funds. Tech grad Charles D. “Charlie” Moseley, IE ’65, was the first of them. Moseley co-founded Noro-Moseley Partners, one of Georgia’s original venture-capital funds, in 1983.

Then Atlanta was surprised to find itself a leading candidate to land a huge high-tech prize:
MCC, a computer-industry research consortium, designed to come up with technologies and products that might stem the hemorrhage of market share to Asian firms. The city lost out to Austin, Texas.

"That was a disappointment, yes, but it also was the genesis of a real start toward a different way of thinking as far as technology development was concerned," Hodges says. "We found out that we could compete against some very strong locations. The four finalists were North Carolina, San Diego, Austin and us; and we came in second. That was a real plus."

The strength of Atlanta's bid was Georgia Tech, Hodges says.

"We got into the competition late, but were allowed to make a presentation in Chicago," Hodges recalls. "They were so impressed with Joe Pettit and Georgia Tech that Atlanta remained in the competition until the final cut."

The state created a research consortium that funded and built the Microelectronics Research Center at Tech to strengthen the Institute's research prowess and enhance Atlanta's image as a high-tech city.

"The state recognized the need to broaden its investment in technology research areas—and microelectronics was a key area," Hodges says. "This was the first effort in that direction."

McKinsey & Co. was hired by the state to do a study targeting the state's high-tech potential. The study, directed by Dan Pittard, IM '71, had two major recommendations:

- The state should invest in research infrastructure—brainpower and buildings, just as it invests in roads, airports and harbors.

### ATDC

**Oldest university incubator center also rates as best**

**By John Toon**

From the basement of an old high school to three locations in Georgia—including one in the state's pre-eminent telecommunications research center—the Advanced Technology Development Center has come a long way in less than 20 years.

Launched in 1980 by the governor and General Assembly to spur growth in start-up companies, ATDC opened shop in 1982 with a handful of companies working amid falling plaster and musty textbooks in former classrooms at the old O'Keefe High School. In 1985, ATDC and its companies moved into its brand-new, 83,000-square-foot headquarters building at 430 Tenth Street. Since then, ATDC has opened incubators in Warner Robins (1991) and on the fourth floor of the Georgia Center for Advanced Telecommunications Technology (1996).

Today, ATDC hosts 45 high-tech companies in technologies ranging from telecommunications and new media to biomedicine and environmental monitoring. During calendar year 1998, ATDC companies reported a record $88 million in financing, new investments, mergers and acquisitions among 15 of its companies. ATDC also celebrated the success of its most famous graduate, MindSpring Enterprises, which reported revenues of $77 million and took its place, No. 35, on Business Week magazine's list of the nation's top information-technology companies. ATDC, the oldest university-related incubator center, has also been rated the best incubator operation in the country by the National Business Incubator Association.

There's more expansion in ATDC's future. Following the model tested in GCATT, ATDC will open other incubators in major research facilities funded by the Georgia Research Alliance. The goal, according to Director Wayne Hodges, is to turn cutting-edge research into new companies by getting business people together with researchers.

This innovative incubator model—putting start-up companies in the same building as leading researchers—will guide ATDC's growth as it begins its next 20 years. Incubators are planned as part of the new Environmental Sciences Building and the Institute for Bioengineering and Biosciences Building—both on the Georgia Tech campus—and the new research facility planned by the Georgia Research Alliance for Skidaway Island. ATDC will also have a biomedical incubator as part of the new biomedical research park formed as a collaborative effort between Georgia Tech and Emory University.

It's a long way from plaster dust and old textbooks. **GT**

John Toon is manager of the Economic Development Institute.
• One organization should manage the process as its only responsibility.

Atlanta civic booster Larry Gellerstedt, ChE '45, who was chairman of Beers Inc., contacted colleagues at other state colleges and universities, tossing around ideas that ultimately would lead to the Georgia Research Alliance.

McKinsey's advice came just in advance of a major culture shift in the engineering world, sparked by the explosion in microcomputer software and the go-go entrepreneurial spirit of the Ronald Reagan presidency, with the resulting easy access to venture capital.

"There was a real legitimization of being an entrepreneur," John Hayes recalls. "In the '60s, if you graduated from a good school, you went to a big firm. The idea of going to a start-up was just crazy. But now, the idea of being an entrepreneur was a lot more acceptable. In the '80s, the start-ups were a raging success."

The 1990s

In June 1990, the Georgia Research Alliance opened its doors, operating with a mix of public and private funding. Its first job was to attract "eminent scholars" from across the nation to fill endowed chairs at six Georgia universities, in three research areas: telecommunications, biomedicine and the environment.

The Georgia Center for Advanced Telecommunications Technology, or GCATT, located contiguous to the Tech campus, spearheads the GRA's telecommunications thrust.

GRA is ahead of its 20-year schedule, Todd said, as measured in patents filed and awarded, royalty income and other income. So far, GRA has invested nearly $300 million in state and private funds, which has attracted about another $500 million in federal funds. It has endowed almost 30 chairs for nationally recognized research professors, at $5 million apiece. It's added 1 million square feet of research facilities to campuses and stocked them with scientific equipment.

In Good Company

Then there's the ATDC. Its member companies report revenues of more than $300 million and employ about 2,500 people. One of its stars is MindSpring, the nation's fifth-largest Internet service provider, which has grown to 700 employees and annual revenue of $78 million.

ATDC also operates incubators at GCATT and in Warner Robins, Ga., where high-tech companies get office space, access to resources at Georgia Tech and the University System, and are linked to investors, accountants and attorneys.

"Entrepreneurship and new-company formation has been the critical element, but the notion was—and remains today—that there must be a mechanism to move discoveries from Georgia Tech laboratories to the marketplace. It's not automatic, and it's not particularly easy," Todd says. "It has taken, and will continue to take, a lot of nurturing and care.

"Looking back, we can see that what was so necessary was the continuous development of the research enterprise. And even though the high-tech industry here is still not as well known as it should be, that's the right sequence," Todd continues. "We were right to invest heavily in building up the research capabilities of Georgia Tech and its partners instead of buying a huge piece of property and saying, 'Y'all come.'

"We have instead invested heavily in building the intellectual content to support a robust technological economy. Historians will say it was the right thing to do." GT

Karen Hill is a freelance writer in Atlanta.
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Robert McMath: Georgia Tech's approach created a culture of resourcefulness among its students and alumni.
For more than a century, an entrepreneurial spirit has been a prominent, though often fortuitous, byproduct of a Georgia Tech education for an extraordinary number of its graduates. Alumni have started new ventures in every industry imaginable, from retail and service businesses to real estate development, manufacturing and, especially, high technology.

In recent years, fundamental changes in business, the economy and technology have heightened the value of that mindset, prompting Tech to shift its informal tradition of entrepreneurship to a formal academic discipline through the DuPree Center for Entrepreneurship at Georgia Tech. In the process, Georgia Tech is also reclaiming its roots.

The entrepreneurial quality of a Tech education is embraced literally in the Institute’s founding documents, according to Dr. Robert McMath, vice provost of undergraduate studies at Tech and co-author of a Georgia Tech history, Engineering the New South. Beginning with the early shop classes, when students machined furniture and metalwork for sale in an effort to make the school financially self-sufficient, Tech students have consistently demonstrated a propensity for doing business.

“Georgia Tech’s practical, hands-on philosophy was to provide the kind of education that would produce graduates who could do useful things and be of economic benefit to the state,” McMath says. “That approach created a culture of resourcefulness among students and alumni that continues to this day. They have to figure out how to get things done, so they are looking for practical solutions rather than theoretical ones.”
The entrepreneurship pervasive over the years throughout the alumni ranks has also been fostered by the sheer rigor of the curriculum, adds Dr. Lloyd L. Byars, interim dean of the DuPree College of Management.

“Working through a hard curriculum gives students an appreciation for hard work, and builds perseverance and self-discipline—all of which are attributes of a successful entrepreneur,” Byars says.

Institutional Support

But while alumni have historically demonstrated a propensity for entrepreneurship, the element of institutional support from Georgia Tech, especially in terms of high-tech entrepreneurship as an economic-development tool, is a relatively recent development, notes McMath.

“The environment encouraged hard work and industriousness, but it did not encourage start-up activity on the part of faculty because that was viewed as being somewhat unseemly,” says McMath. “For a while in the post-war years and post-Sputnik era, the research side at Tech was so deeply wedded to NASA and the Department of Defense that it didn’t bother with local and regional economic development.”

McMath points to a turnaround during the 1970s and early ‘80s with the administration of Dr. Joseph M. Pettit, who had helped engineer the development of Silicon Valley while at Stanford.

“That was when Tech began actually encouraging faculty, staff and students to be entrepreneurial,” he explains. “In some ways it was a shift back to our roots, with Tech beginning to reconnect with the state through the Advanced Technology Development Center, the Economic Development Institute and the Georgia Research Alliance.”

The Dupree College of Management embodies the Institute’s aggressive promotion of entrepreneurship through its primary academic thrusts: management of technology, entrepreneurship and international business.

These areas overlap and complement each other, Byars says. “Most entrepreneurship activities of Tech students, faculty and alumni focus on technology, which is the major force behind the growing globalization of the economy.”

Most of the college’s entrepreneurial activity is housed in the DuPree Center for Entrepreneurship, founded four years ago and, like the college, named for its primary benefactor, Thomas E. Dr. Thomas Boston: “Very small companies run by creative entrepreneurs, because they’re nimble and can react quickly, can be very effective competitors with the giants that can’t maneuver as well.”

Characteristics of an Entrepreneur

What makes an entrepreneur? Three Tech entrepreneurs reveal a consensus on four attributes of individuals who start and operate their own successful businesses:

• Passion — “The first thing an entrepreneur has is a passion for something, whether it be a technology, an idea or a company of some sort,” says John Imlay, IM ’59, chairman of Imlay Investments. “The game plan changes with money, competition and all that, but you have to always know where you are going and keep that passion even though you go through a lot of minefields to get there.”

• Focus — “Determining what is and what’s not important is somewhat of an art,” says Thomas Noonan, ME ’83, president and CEO of Internet Security Systems Inc. “Choosing to focus on the important things and letting everything else go is key. Our lives are completely unsettled. Paying bills, shopping, haircuts, oil changes, tires, vacations, friends, cutting the grass—all go untouched. Somehow they become very unimportant once you are on the hunt.”

• Objectivity — “The successful entrepreneur, in my view, is not really a high risk-taker,” says Tom DuPree Jr., IM ’74, chairman and CEO of Avado Brands. “He or she mitigates risk with information, and with that information appeals to his or her intellect rather than emotion.

“If you have a dream, think it through logically and gain additional information to the point where it’s pretty clear it ought to be a good idea and should work; you’ll execute that vision. If you are afraid, if you allow fear to intercede between your intellect and your vision, then you won’t execute it. It’s not a dry intellectual exercise by any means, but the emotion has to back the intellect, rather than the other way around.”

• Self-confidence — “As an entrepreneur, you usually hit the wall 10 times a day and have to choose to either go on or fold up the shop,” says Noonan. “If folding becomes an option, you are done.” GT
DuPree Jr., IM '74, himself an entrepreneur in the restaurant business.

According to its mission statement, the center aims to promote the teaching of entrepreneurship, conduct related research, and provide education programs and service activities that encourage entrepreneurial activity.

The center's academic programs are directed at the breadth of Tech's curriculum. Undergraduates throughout the Institute may take the introductory Entrepreneurial Forum or a class on the economics of race and entrepreneurship. A concentration in entrepreneurship is offered for master's degree students in management. A certificate program in entrepreneurship is offered for electrical and computer engineering students, and a minor is offered for master's and doctoral students in biomedical engineering and life sciences degree programs.

"Depending on their majors, students can concentrate in entrepreneurship by taking classes the center coordinates and makes available," says Dr. Terry Blum, director. An environmental and civil engineering major, for example, can earn a certificate in entrepreneurship by taking a sequence of classes that culminates in either a new-venture-creation class or a business-plan class, she notes.

Marketing Technology

Dr. Thomas D. Boston, a professor of economics, directs the DuPree Center's African-American entrepreneurship program.

"The academic programs at Georgia Tech are positioned at the forefront of the technological developments that are driving changes in business as well as society," says Boston. "Students and faculty are constantly creating new kinds of technology and looking for ways to market those technologies. Tech's traditional support for business creates a kind of feedback effect throughout the environment that generates the entrepreneurs who start new ventures on their own, and those who are starting new activities within larger, existing companies."

But isn't entrepreneurship an art rather than science, more intuitive than instructional? And if so, can the subject truly be "taught" effectively?

"You have to be creative, and you have to have ideas, but the execution part, especially in technology entrepreneurship which creates jobs and economic value, requires a multidisciplinary bag-full of knowledge and skills that will make you more likely to succeed," Blum says. "Anyone can come up with an idea, but it doesn't mean they..."
As Tom DuPree Jr. sees it, creating an academic and research center devoted to entrepreneurship was simply a matter of matching an opportunity with a need.

A 1974 industrial management graduate and highly successful restaurant entrepreneur, DuPree was approached four years ago about helping Tech establish an entrepreneurship program within what was then the School of Management.

DuPree remembers being told of a management faculty member's research that supported what he had known intuitively.

"Many of my classmates started their own businesses," he says, "as have hundreds and hundreds of other Tech grads. So it was interesting to see that Georgia Tech produces the highest number of CEOs per capita of any college or university in the country. And they've done it without any formal curriculum on entrepreneurship. Clearly, that's an opportunity to do something more."

The need was an Institute-wide, multidisciplinary center, a "go-to" place as DuPree calls it, that would provide and coordinate courses aimed at honing entrepreneurial skills and preparing students to do business in an entrepreneurial setting. A $5 million gift from DuPree provided a healthy startup for the DuPree Center for Entrepreneurship and New Venture Development.

"We want to enhance the ability of the graduates so when they get out they are better prepared to do exactly what so many of them have been doing all along," he says. "Let's give them some tools to work with and some frameworks to follow. We'd like to graduate an even higher number of better-qualified entrepreneurs from every degree program."

Of particular interest to DuPree is the center's emphasis on African-American entrepreneurship. "It's an opportunity to enhance minority opportunities," he says, "it is also a distinct way for fully enfranchising a variety of American citizens."

Entrepreneurship has also been boosted in a broader sense, thanks to DuPree's generosity. His Capital Campaign award of $20 million to the management school two years ago—the largest ever by a living person and second-largest in Tech history—set the stage for the management curriculum's return to college status earlier this year as the DuPree College of Management.

DuPree is a study in persistence. By his own admission, he flunked out of Tech twice and ended up with a GPA "rounded upward" to 2.0. But perhaps the most important part of his Tech education, DuPree says, is that it taught him an appreciation for hard work.

"There's kind of an unwritten expectation that you are going to excel at whatever you do," he explains. "We all learn that if you can get through Ma Tech, you're able to handle just about anything life throws your way."

DuPree has lived up to that. In 1979, he entered the restaurant business with a single Burger King. Seven years and five more Burger Kings later, he sold his franchises to buy several Hardee's restaurants and the first of many Applebee's restaurants. As chairman and CEO, DuPree guided his company, Apple South Inc. to phenomenal growth, earning recognition in 1992 as Georgia's Retail Entrepreneur of the Year. Two years later, Forbes magazine described Apple South as the eighth-best small company in the nation.

DuPree isn't standing pat in his fast-changing industry. For the past three years he has been selling Apple South holdings and acquiring new restaurants nationwide under the company name Avado Brands.

One of DuPree's greatest pleasures is seeing others reach for and grasp the kind of success he has enjoyed—not simply financial success, but the reward of following an entrepreneur's vision.

"I've been in a position to help Tech students fulfill their dreams," he says. "That's what it's all about—unleashing people with opportunity. Often we seem to approach life with shackles rather than saying, 'Let's see what we can do.' When you remove some of those shackles and give people confidence and support, more with words and actions than with a check—though checks are important—that's when people's real abilities come roaring out. You never know what end-product you'll get. In all likelihood it will be far beyond anything you dreamed." — Gary Goettling GT
can evaluate whether it is a compelling idea according to the techniques of analyzing a market or even an emerging market.

“That doesn’t mean people who don’t come through our program will not be successful or that everybody who comes through such a program will be successful. We’re simply trying to make entrepreneurial ventures a lot less treacherous.”

The courses cover such topics as how to obtain financing, the workings of public and private markets, and how to assemble a management team. Participation in the center’s curriculum has the extra benefit of exposing students to the “social capital that one develops in being in a network at Georgia Tech with our alums and the entrepreneurial community,” Blum adds. “This can also facilitate the other kinds of resources: the management team and the financial resources.”

Blum cautions against drawing too narrow a definition of entrepreneurship. Applying a broader perspective, she says the qualities of flexibility, creativity, teamwork and continual learning that characterize new-venture entrepreneurs will also provide a critical competitive advantage to growing and large companies. Thus the center’s perspective also serves to provide leadership training to students who will later head major corporations.

“To be successful, even in a company that’s not your own venture, requires entrepreneurial knowledge, skills and attitudes,” Blum says. “Companies have to be innovative and entrepreneurial to compete in a global economy in the 21st century.”

Her observation is underscored by Boston, who notes that profound business-world changes—including deregulation, career insecurity and layoffs (a.k.a. “downsizing”), changing markets and technological ad-
John Imlay: Software Pioneer

Keep your big company small.” That adage encapsulates the entrepreneurial business philosophy of John P. Imlay, IM ’59. It’s a belief he observed in his former life as an enormously successful computer-technology business owner, and one he still advocates as a high-tech venture capitalist.

But behind that deceptively simple slogan lies the unflinching commitment, hard work and instinct of a true entrepreneur.

A pioneer of computer software, Imlay is the stuff of legend. In 1971, when “computer” meant “mainframe,” Imlay was a salesman with Univac-Honeywell. He noticed that each of the large, complex applications he sold was built essentially from scratch for every client, a process involving much time and re-programming. He asked himself, “Why do we have to re-invent the wheel each time? Why not package some of that software and sell it like you sell records for a record player?”

Imlay quit his job and purchased Management Science America (MSA), a near-bankrupt consulting and computer-services firm in Atlanta. Under his leadership, MSA became the first software-applications supplier to break the $100 million mark in annual sales, and by 1981 had become the largest independent software company in the world. In 1990, it was sold to Dun & Bradstreet for $333 million.

“People are the key,” he says. “Successful companies make sure people have the information they need to make good decisions and the authority to act upon them—they have a high degree of autonomy. If you’ve empowered people to make decisions, the right people will make good ones most of the time. Everyone makes mistakes, but you can’t let those inevitable mistakes stop the show. Having the freedom to sometimes fail is the same freedom it takes to succeed.”

Imlay’s management philosophy, which embraces a high degree of internal entrepreneurship he calls “intrapreneurship,” was detailed in his 1994 book, Jungle Rules: How to be a Tiger in Business. The book is structured around 20 aphorisms reflecting his imaginative, unconventional approach to business problems.

A ripple effect of entrepreneurship creating new companies, new jobs and new technologies is another legacy of MSA’s employee empowerment.

“It served as a training ground for young technology managers, especially in the early days when this industry was still new and everybody was learning along the way,” he says. “As our sales grew from a couple million to $550 million a year, some people would drop off to take advantage of the new opportunities they saw.

“I can identify over 50 CEOs of high-technology companies who have come out of MSA,” Imlay adds. “To see these young people succeed—that’s really the reward.”

As chairman of Imlay Investments, a venture capital firm formed with his share of the MSA sale proceeds, Imlay has a vehicle with which to indulge his fascination with new technology and his desire to help entrepreneurs in the Southeast follow their dreams.

“That’s my passion at the moment—to watch these young people succeed,” says Imlay, noting that only one in 10 high-tech ventures survive.

With his penchant for exceptional timing, perhaps it’s not surprising that Imlay’s investment company is riding a new wave of venture-capital activity in Georgia.

Imlay’s investments include stakes in Internet Security Systems, a booming developer of computer- and network-security products; and System One Technical, a temporary-personnel firm for high-technology companies.

With its largely untapped home and consumer markets, the Internet offers staggering potential as a communications and commercial medium, Imlay says.

“After 40 years of unlimited growth of technology, we’ve yet to reach our infancy in terms of the ‘Net and computer capability,’” he notes. “Young people and entrepreneurs have a terrific future in technology. It’s really an amazing and exciting time. Sometimes I wish I was starting in business again.”

— Gary Goettling
Profiles in Entrepreneurship

Don Chapman: Managing for Success

Don Chapman has an eye for profitable ventures. Among the products that have caught his entrepreneurial eye: eyeglasses, catalogs, meat, fashion accessories, printing equipment, snack foods and basketballs.

Chapman, IM ’61, has made his living buying companies, running them for a few years, then selling them for profit. The products his companies have sold have just one thing in common: Don Chapman thought they had potential.

Did he get to know all about the products in every business he was involved in? “I hope so,” he says, “I was the chief operating officer of them.”

The son of an Atlanta lawyer, Chapman didn’t set out to be an entrepreneur. But he realized he had a talent for identifying potential markets and figuring out how to make them profitable, and soon capitalized on what he did best.

“Good management skills are transferable,” he says. “Specifics can be learned.”

Today, Chapman is at the helm of TUG Manufacturing Corp., a company that makes airline and ground transportation equipment. The company sells its products worldwide.

Chapman recently announced the merger of TUG with Stewart & Stevenson of Houston. When the merger is complete, he will be president and chief operating officer of S&S/TUG. He also co-owns a printing-press business and is involved in several charitable causes.

Such a juggling act is not new to Chapman. He has spent his career doing several things at once.

After graduating from Tech, Chapman sold asphalt and spent time in the Air Force. In the early 1970s, he partnered with Tedd Munchak to began finding and acquiring companies.

“I just felt that was something I had a gift for,” Chapman says. “I thought there were businesses out there that could be profitable.”

They started with snack food companies in Chicago, Atlanta and Puerto Rico. Chapman steered clear of high tech and heavy manufacturing at first. “Our skills,” he says, “were in marketing and distribution.”

Most acquisitions he kept about three years, although he kept some longer. “Our goal was to improve the businesses and sell them,” he says. “Basically, our goal was to look for something that would sell for a profit.”

After a decade of buying and selling, Chapman launched his most challenging project. His idea: A new kind of eyewear business that would provide customers with better service and a better product at a lower cost. The company: Opti-World, a chain of eyeglass and contact-lens superstores that took root in the Southeast long before superstores were available for everything from pet food to shoes.

The business, which Chapman started from scratch and sold a few years ago, was not only a new company, it was a whole new marketing concept in the Southeast. “Opti-World was our most successful venture,” Chapman says. “We had a lot of good people involved.”

TUG Manufacturing, a small company purchased in 1977, also proved profitable. The company, now much larger and based in Kennesaw, Ga., expects sales in 1998 to be around $50 million.

Chapman also has brought his entrepreneurial talents to community service. As president of the Georgia Tech Alumni Association in 1983, he led the Roll Call Campaign beyond the $2 million mark for the first time. He has also been involved in programs for the mentally retarded.

After more than a quarter-century of buying, running and selling companies, what’s next for Chapman? “The merger of TUG will keep me busy for some time,” he says. “After that, we’ll see what happens.” — Patti Puckett

Patti Puckett is an Atlanta freelance writer.
Advances, particularly in communications—are compelling businesses to operate much differently than in the past if they are to prosper.

"It was once an accepted premise that the economies of scale associated with large companies and large-scale production were the leading edge in competitive markets," he says. "But very small companies run by creative entrepreneurs, because they’re nimble and can react quickly, can carve out markets and be very effective competitors with the giants that can’t maneuver as well. So if they are going be competitive, they have to bring on board and nurture the kinds of talent you find in a lot of these small, aggressive, entrepreneurial companies."

Entrepreneurial principles are also appropriate for meeting the goals of virtually any organization, including non-profits, Blum says.

"Georgia Tech is a public school, yet we’re incredibly entrepreneurial," she explains. "We continually innovate. We try to commercialize our technology through licensing and new-company development. And though we might do different things with our ‘profits,’ we’re a very entrepreneurial operation."

ATDC Makes the Point

Her point is illustrated by the Advanced Technology Development Center (ATDC), founded in 1981. Primarily involved with helping high-tech startups by providing management assistance and facility and office space, ATDC also promotes entrepreneurial ventures by large, established companies through its “landing party” effort.

The idea is to get established companies—Northern Telecom was the first—to sponsor a small-scale research and development operation near Tech, usually for a set period of time.

“Our mission is to create technology jobs,” says Wayne Hodges, director of the Economic Development Institute. “This is a way of working with large companies that want to come in and get familiar with the terrain and the resources here. Hopefully their initial presence will grow, and they’ll start doing bigger things here.”

In the past, companies were reluctant to geographically separate employees from the mainstream for special projects because the workers often felt left out in terms of promotions and everything else going on in the company, according to Hodges. But with the need to start new products and get them to the marketplace as quickly as possible, "this idea has a lot more relevance to large companies than it once did. We think this is something we’ll see more and more,” he says.

From a company’s point of view, sponsoring an...
One of the advantages of ATDC is the “chance to tap into the student talent and hire them as co-ops, grad students or Ph.D.s, and see whether or not they fit into your culture.”

Margie Lewis proves that customer service pays off. During 14 years with the Nuclear Regulatory Agency in Washington, Lewis, NE ’79, was involved in customer contact and employee performance. “I thought I could provide a better service to customers than larger companies that were more concerned with just the bottom line.”

In 1993, she withdrew her $10,000 savings account and started Parallax, an engineering and environmental management company, in partnership with fellow Tech alumnus Dolan P. Falconer Jr., NE ’78, MS NE ’79.

Lewis is president and chief executive officer of the Germantown, Md., firm. Parallax inspects nuclear power plants, puts in place safety procedures and cleans up nuclear and hazardous waste.

Her first contract was a $2 million, 18-month project with the Department of Energy. By the end of 1993, sales totaled $700,000. A year later, revenues had more than tripled, to $2.2 million. In 1995, when Lewis added sales of nuclear management computer software, sales hit $13 million.

Parallax could be a $50 million company within five years, she says. “We’re growing, and that’s interesting because the [nuclear power industry] market is shrinking.”

R&D landing party at Tech provides an entree to the greatest high-tech resource of all: brains.

“You get the best window on the folks who are here, and you can develop relationships with faculty that are very productive for everyone concerned,” Hodges says. “You have a chance to tap into the student talent and hire them as co-ops, grad students or Ph.D.s, and see whether or not they fit into your culture.”

At present, Lucent Technologies is supporting a landing party—its formal name is the Atlanta Product Realization Center—working on new-product development in wireless technology. Due to a lack of space on campus, the staff of 40 is housed in the Georgia Public TV building next door to the Georgia Center for Advanced Telecommunications Technology. The project manager is Bryant Isaacs.

“There are a couple of new areas in wireless we want to explore from the point of view of product realization. Not just research, but it’s getting to product and getting to revenue,” says Isaacs, who believes an entrepreneurial approach offers many advantages over working in a large lab environment.

“We want to make sure we can incubate properly without being sucked into the larger bulk of what’s going on around us,” he explains. “We’re also trying to get a number of things to market quickly, which means the culture we’re trying to create here might be different from what we have in our large labs.”

That culture includes a flatter management structure with fewer layers of approval and other impediments, no large meetings and more creative freedom.

“We are viewed as part of a business within Lucent,” Isaacs says. “There are some restrictions— I can’t solicit investors, for example—but we are trying to take the best of Lucent with us and leave some of the bureaucratic stuff behind. The biggest plus is that you can get on with the job.”

The Tech connection has paid off well for Isaacs and his wireless entrepreneurs. The Lucent group includes several Tech students and alumni, and it works closely with an ATDC startup called RF Solutions, founded by Tech students.

“Georgia Tech, I think, has the right sort of organization for this kind of entrepreneurial R&D activity, and not just the academic side but the commercial side as well,” Isaacs says. “It’s part of the Georgia Research Alliance, and some of its research centers are basically focused on commercialization of technology. And because it’s Georgia Tech, access to resources is easier.”

Gary Goettling is an Atlanta freelance writer specializing in business and technology.
The United Methodist Church might seem an unlikely place to find an entrepreneurial mindset, but the qualities that create new businesses can also create new churches.

Early in his career, the Rev. John A. Simmons was given an assignment: start a new church in Roswell, Ga. With only a piece of land and an unerring faith in his objective—"We didn't even have a box of gem clips"—the task was much like starting a new business," says Simmons, Bio '71.

"I knocked on doors and followed up on leads for six months before we even started having worship services," says Simmons. "I gathered people in small groups and tried to convince them that it would be an exciting adventure as well as spiritually satisfying to be a part of a new church in that community—and it worked."

The effort was aided by establishment of a preschool program at the church that filled a conspicuous community need, Simmons adds.

For the next 11 years, Simmons was pastor of Northbrook United Methodist Church. His success in Roswell led to his appointment as senior pastor of Glenn Memorial United Methodist Church on the Emory campus. For eight of those years, he also was president of church development for the North Georgia Conference, leading an effort to start or revitalize about 30 churches.

Like a business entrepreneur, Simmons defined his product and developed a market, relying on ingenuity, salesmanship and hard work. "I considered this very much in keeping with my analytical, problem-solving training from Georgia Tech."

In 1996, Simmons earned his doctorate at Candler School of Theology at Emory University.

His current post as pastor of Glenn Memorial United Methodist Church also requires an entrepreneurial attitude. Simmons, like any good businessman, cannot take success for granted, and must remain sensitive and responsive to parishioners' needs. From location and "a spectacular building" to a well developed pre-school program and a recently added sports league, the church works to attract new members.

At the same time, Simmons points out the pitfalls of trying to sustain a congregation on the strength of marketing tactics alone, citing Christian aerobics classes and youth ski trips as worst-case scenarios. The risk, which he says also affects many business entrepreneurs, is that the organization's purpose becomes subordinate to the drive to attract customers.

"Are we there to give people what they're looking for, or do we sell them on belonging to a Christian community?" he asks. "Tom Peters wrote in *In Search of Excellence* that a business needs to remember to 'stick with the knitting.' The 'knitting' in the Methodist church is belonging to a community of faith and living the story that we find in the gospel. That's what I market."

—Gary Goettling
Charlie Bass: Unregulated Entrepreneurship

A n organization that has spent much of its 142-year corporate life as a public utility protected by the inertial comfort of government regulation would hardly seem the place to embrace the risk-taking, rough-and-tumble of entrepreneurial-style management.

Yet that's exactly what's happening at Atlanta Gas Light.

When the natural gas industry in Georgia was deregulated this past November, the state's oldest corporate entity was thrust into a new life as an open-market competitor.

"We are developing strategic plans to guide us for the next five years," says Charles W. "Charlie" Bass, IE '69, president of AGL Investments. "Our vision is to be the acknowledged industry and market leader in the evolving energy utility and related services markets."

Two years ago, Atlanta Gas Light was reorganized under a holding company named AGL Resources. One side of the chart was the utility Atlanta Gas Light, the other a new, non-regulated company called AGL Investments. Whereas virtually all of the company's income has come through natural-gas delivery, the expectation is that by the year 2004, about one-fourth of company profits will derive from other activities.

It's a fundamental culture change for the company, which is essentially reinventing itself in management and business practices, according to Bass, a former Alumni Association trustee. But it's also a great opportunity, he adds, which can only be seized with an entrepreneurial attitude, given a highly competitive market with many aggressive players. The approach for the keepers of the blue-flame logo is to fight fire with fire.

AGL Investments' rapidly growing portfolio includes a host of unregulated subsidiaries, including AGL Propane, and a joint interest with Sonat in gas and power marketing. A startup company, UtiliPro, provides customer service and remittance processing services to the energy industry. Another startup, Cumberland Gas Pipeline, is a 50-50 venture with an Oklahoma firm.

Atlanta Gas Light's top management was itself a prominent advocate for deregulation, and lobbied the Georgia Legislature to open the market.

"We believe that competitive markets are more efficient and provide lower cost to the consumers," Bass says. "That model also happens to be financially better for us."

New entrepreneurs don't have to contend with molding new attitudes and re-writing job descriptions; that's an additional and critical extra hurdle faced by companies in transition.

"Every aspect of our corporation, from the holding company through the regulated utility and the entrepreneurial effort of AGL Investments, has had to bring about enormous change, but not without its difficulties," Bass admits.

"There were many people who were quite comfortable operating as a regulated public utility and resisted the type of change you have to make to flourish in a competitive environment. On the other hand, we also have a host of people in-house who have advocated change and helped to push it forward by devising new ways of operating."

Communication with employees, customers and the new gas marketers is keeping people informed and involved throughout the change process. Development of new processes and responsibilities within the organization was facilitated by cross-functional teams examining "every aspect of the business from customer service to legal, from information systems to human resources," Bass explains.

"That played an important role in changing the mindset here toward an entirely new way of doing business in a changed world."—Gary Goettling
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Ten Tips for Entrepreneurs

By Gene Griessman

Gene Griessman has made a career of studying high achievers, including some of the world's most notable entrepreneurs. His books include Time Tactics of Very Successful People and The Words Lincoln Lived By. Today, he is a motivational speaker living in Pacific Palisades, Calif. Here are his 10 basic tips for successful entrepreneurs.

1. Immerse yourself in the subject. Flank high achievers mention flashes of insight that follow long periods of preparation. Healthdyne founder and philanthropist Pete Petit said his aptitude is being able to synthesize data, seeing patterns and opportunities that others miss.

2. Keep your eyes and ears open. "Keeping my eyes open" is the answer Oscar de la Renta gave me when I asked him how he keeps his creative forces alive.

3. Be wary of old mental habits. Walter Lippmann once wrote that what we see depends on the habits of our eyes. Don't be afraid to think about the subject in an unconventional way.

4. Trust your own ideas. When Frank Lloyd Wright visited Georgia Tech years ago, student John Portman asked the famed architect for advice. Wright replied: "Go seek Emerson." Portman explained years later that Wright was referring to Ralph Waldo Emerson's great essay "Self Reliance," which Portman still reads once a year. Emerson declared: "Trust thyself. Great men have always done so."

5. Look for analogies in other fields. Don't limit yourself to people in your field or discipline. Most businesses, regardless of the field, have common problems. Somebody outside your field may have solved your problem, but you won't know it if you limit your contacts just to people in your field.

6. Become slightly underemployed. You'll have a very limited view of the world if you always have your nose to the grindstone.

7. Use others' eyes and ears. Find experts to help you. An expert, with in-depth knowledge, can save you time, money, and perhaps your entire project. In addition, create a system in your organization so that your associates will give you feedback. They may see something you don't.

8. Think about different ways to use existing or emerging technologies. Don't consider it second-rate science to find another use for an existing invention. You may accomplish more than the original inventor, who simply made an obvious application.

9. Look for the essence of the concept. Don't be distracted by irrelevant data. Data may be absolutely accurate, but absolutely meaningless.

10. Look for trends and tendencies. "If we could first know where we are and wither we are tending," Abraham Lincoln stated in a famous speech, "we could then better judge what to do, and how to do it." Forward thinking is time well spent.
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Georgia Tech tapped one of its most capable resources—the Georgia Tech Advisory Board—for expert advice about its unique and still evolving entrepreneurial culture. The 60-member board, predominately made up of alumni, includes some of the most successful business leaders and entrepreneurs Georgia Tech has given the Real World. The board, which meets twice each year, uses its collective leadership to promote policies and advance the Institute’s objectives in the corporate world.

For a day-and-a-half in October, the board immersed itself in the culture, studying classroom curriculum, start-up successes, student entrepreneurs, technology transfer, incubator companies, venture-capital resources, and strategic alliances extending well beyond the campus to other research universities, state agencies and local organizations.

The Institute’s entrepreneurial thrust has roots that go to its founding as a technological school—forged in a practical shop culture, it was to produce technically trained graduates who could help transform the state’s economy, Tech President Wayne Clough told the group.

Clough CE ’63, MS CE ’65, has a modern blueprint for Tech’s continued role; building an economy based not on heavy industry, but high technology. As a doctoral student at the University of California at Berkeley, Clough witnessed firsthand how Stanford and Berkeley collaborated to build Silicon Valley. He later taught at Stanford and got to know Fred Terman, the dean of engineering, who helped stimulate the Bay area’s high-tech boom. Now, he is applying the lessons he learned in Atlanta.

“We are uniquely equipped to help Georgia gain its share of high-tech economic growth, beginning with our prowess in research and our reservoir of talented faculty,” Clough told the advisory board. “We also produce some of the most technologically talented young people in the world.

“We are home to the Economic Development Institute and the Advanced Technology Development Center—two entities designed to grow technology-driven industry in the state.” EDI is the state’s technology-transfer agency, and ATDC is its high-tech business incubator.

In addition, Tech works with the Georgia Research Alliance, other research universities and the state Department of Industry, Trade and Tourism in economic-development initiatives. Clough served on the steering committee for the Chamber of Commerce’s “Industries of the Mind” strategy, which focuses on creating and attracting industries in telecommunications, biotechnology, advanced manufacturing, and software systems and services.

“The chamber is a powerful ally in our efforts to attract industry to Atlanta that complements our curriculum and research strengths, and provides jobs for our students,” Clough says.

Night to Day

Tech’s entrepreneurial programs represent a major enhancement of its “can do” culture. The curriculum includes courses that prepare students to start their own businesses—or to bring an entrepreneurial spirit to existing industries.

“It’s night and day from when I was here,” says Charles D. Moseley Jr., IE ’65, a partner in the Atlanta venture-capital firm Noro-Moseley. “What you were supposed to do then was go and get a job with a big company. Among the main questions you were to ask were: What’s the pension fund like and how are the benefits?” That was just the nature of taking a job when you were 21 years old in 1965. It’s very different today. Georgia Tech has really recognized the difference.”

It is a difference that even marvels recent graduate and co-op student Michael Bridges, IE ’91, MS IE ’93.
"I was pleased that Georgia Tech has enhanced its programs since I received my undergraduate degree," Bridges says. "I came back to graduate school and found there were courses in corporate entrepreneurship and organizational changes due to entrepreneurship."

Terry Blum, director of Tech's DuPree Center for Entrepreneurship, and a participant in a panel discussion with several graduate students, says the cultural change on campus accelerates as students are exposed to the idea of entrepreneurship. "Programs are being implemented at an quickened pace and in an environment that is very receptive," she says.

Observing that all three graduate students on the advisory panel are carving out entrepreneurial careers, panel moderator Mark Smith, assistant to the president, asked, "Would undergraduate students benefit from entrepreneurial-type activities as well?"

"It's been my experience that undergraduate students have a stronger impulse toward entrepreneurial interests than the typical graduate student does," replies economics professor Thomas Boston, who heads the African-American Entrepreneurship Program. "The typical graduate student is locked in a track that is very specialized. I find a lot of enthusiasm among undergraduate students. And that enthusiasm has to be nurtured."

Some faculty members, though, have expressed concern that entrepreneurship is not central to educating students, Boston says.

During round-table discussions, John E. "Chip" Akridge III, ME '68, president of John Akridge Co. in Washington, cautioned that entrepreneurial courses should be taught in harmony with Tech's academic mission.

Balanced Programs

The need for balance was echoed by venture capitalist Steven A. Denning, managing partner of General Atlantic Partners in Greenwich, Conn., who participated on another panel.

"We're very involved with the business school at Stanford University," Denning says. "There's such an entrepreneurial craze there that it's gotten out of whack. The traditional employer does not even visit the campus these days because you can't even get the students to think about traditional businesses. Yet most of the successes existed before entrepreneurship programs were added. It is important that you maintain a balance when you're setting up those programs."

Sam Williams, president of the Metro Atlanta Chamber of Commerce, keynote speaker at the event, sees Atlanta developing such a powerful technology-driven economy that it will soon rank among the top five in the country.

Trouble is, he says, a lot of people don't see it.

The chamber conducted a survey of 100 chief executive officers of major firms nationwide and discovered a blind spot in the view of Atlanta as a dazzling high-technology center.

But Williams, EE '68, is sharing his vision with a crowd that often sees what others don't. Many of the board members are uniquely familiar with Atlanta and its technology potential. They helped shape its high-tech present.

Williams' perspective is pertinent to the entre-
Michael Bridges, IE '91, MS IE '93

A co-op student, after earning undergraduate and master’s degrees, Bridges joined Federal Express working with their Internet client server. He left to join five partners in starting up his own company: tuneup.com in Palo Alto, Calif. He is now earning his doctorate in management.

“I’ve found I don’t have to leave the state to learn about new ventures, how to get funding for these ventures and networking groups,” Bridges says. “I am taking a class on new venture creation and finding out about a great many resources, such as the ATDC. It is a wonderful opportunity to learn about commercializing products. I’m getting prepared to help lead a company.”

Charles Whatley

An Atlanta native and economics graduate of Yale University, Whatley worked on Wall Street before joining the family construction business. He is earning a doctorate at Tech and was the original coordinator of the Small Business Resource Center, a public/private joint venture.

“My plan is to move to Africa. Atlanta will still be a home base. I have a partner who is in San Antonio, and we have incorporated a company in East Africa to transfer technology to African nations. We are also working with the Malaysian government. My partner served on the multimedia board in Malaysia. We would like to find some businesses that are ready to graduate from ATDC that we can co-locate here and in Malaysia.”

Harris Bergman, MS ME '95

A doctoral student in the school of chemical engineering, Harris Bergman is starting a consulting firm that accurately reads Magnetic Resonance Images to diagnose atherosclerosis and cardiovascular disease.

“I came here because I was interested in the collaboration that Georgia Tech is having with Emory’s School of Medicine,” Bergman says. “I spoke to a lot of the physicians and said, ‘What can I do to make your job easier and raise the standard of patient care?’ One of the ideas that I came up with became the basis of my Ph.D. research. I’m now working on commercializing and starting my own business.”
The Atlanta Chamber of Commerce has begun a five-year marketing plan to attract and grow those “Industries of the Mind” that produce a technology-energized economy, including telecommunications, high-tech manufacturing, software and computer-related services, and biotechnology and biomedical industries.

The goal is to establish Atlanta as a technology hub in a league with Silicon Valley, Boston, Dallas, Denver, Northern Virginia-Washington and Raleigh-Durham, says Chamber president Sam Williams, EE ’68.

Williams is in good company. In addition to Tech President Wayne Clough, the chamber’s “Industries of the Mind” steering committee includes: Charles R. Brown, BC ’62, Technology Park; Jay Reidenbach, Lucent Technologies; Michael Reene, IBM; John Robinson, BellSouth Telecom; Mike Dooley, Motorola; Robert Minkhorst, Philips; Jim McDonald, Scientific-Atlanta; James C. Davis, The Harbinger Group; Leland Strange, Intelligent Systems; Parker “Pete” Petit, ME ’62, MS EM ’64, founder of Healththyme; Jack Luchese, CytRx Corp.; Charles Moseley, IE ’65, Noro-Moseley; Stephen Fleming, Alliance Technology; Glenn Cornell, NationsBank; Jim Martin, Georgia Power; John Yates, Morris, Manning & Martin; Dick Yarborough, Georgia Tech; Alan A. Burgess, Andersen Consulting; Kermit Hairston, metro Atlanta chamber; Annie Hunt Burris, Board of Regents; and William “Bill” Todd, IM ’71, president of the Georgia Research Alliance.

Technology Hub Steering Group

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Entrepreneurial issue because many board members see Georgia Tech as the engine behind Atlanta’s 21st century economy.

“Talent is the key,” Williams says. “You grow talent at Georgia Tech, and you recruit talent from all over the nation. That’s really the key to what we’re trying to do.”

Atlanta has an aggressive business environment, venture-capital resources and the infrastructure in place—including the research strength of Georgia Tech and five other research universities, Williams says.

“We’ve identified in metro Atlanta 3,000 companies that have 160,000 jobs in technology,” Williams says. “That’s 8 percent of the work force in metro Atlanta.”

But Atlanta lacks public perception as a high-tech city.

That will change, Williams says. And the change of perception will attract the talent and companies to catapult Atlanta into the forefront of technological cities, just as Tech is climbing into the elite among technological universities.

Georgia Research Alliance President William Todd agrees, and even sets a deadline: the year 2010.

“It’s an audacious prediction, but we’ll be in the top five by 2010,” Todd says. “We’ve got the input; we’ve got the output, and we’ve got the model.”

The model, Todd says, was developed by McKinsey and Co. in 1985 under the direction of Dan Pittard, IM ’71, now a Chicago investor and chairman of the Georgia Tech Advisory Board. It called for the state to invest in “facilities, instrumentation and people” to strengthen the research base at the state’s universities and develop research superstars. The result will enhance existing companies, stimulate the creation of new high-tech businesses (which would create more jobs), and attract other advanced-technology firms.

It’s happening, Todd says.

“We received national validation of this cause-and-effect” through a “cyberspace study” by the American Electronics Association that found Atlanta was leading the nation in attracting high-tech talent.

It was a sentiment echoed by Denning.

“Five years ago, if you had looked at our portfolio, you wouldn’t have found any software business in Atlanta,” the venture capitalist says. “Today, out of 35 software businesses, five are headquartered in Atlanta. One of them has its principal operation here; two were spin-offs of large corporations. Three of them are businesses that have moved from outside the United States to Atlanta. They specifically chose Atlanta.”

An obvious question that sprang out of the board meeting: How does Georgia Tech teach students to become entrepreneurs?

“We select people who are going to be leaders,” says Blum. “That’s the only way you get into Georgia Tech. And then we do no harm. There’s a certain amount of knowledge, skills and attitudes that you can impart in the educational process that will make the likelihood of success greater.

“What we do with our students is let them dream. It’s analogous to: ‘Can you teach ethics?’ Maybe you can’t, but we try.”

GT
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Novel Start-Up

By John Dunn
Photography by Gary Meek
n the ninth grade, computer-whiz Christopher Klaus got the “brainstorm” that would make him a multimillionaire by age 24 from an unusual source—William Gibson's 1984 science-fiction classic “Neuromancer.”

The protagonist in the near-future novel seeks to steal data from a worldwide computer system guarded by an electronic sentry that probed the global network for vulnerable access points, signaling any intrusion.

The idea of creating an electronic sentry that would defend computers against hackers fired Klaus' imagination and influenced his programming, both in high school and as a student at Georgia Tech.

"Knowledge can be used for good or for bad," Klaus says. “I knew, morally and ethically, what I wanted to do was take the information hackers had—how to break into computer systems—and use it for good.”

Klaus, who solved thousand-piece puzzles at age 3 and consistently beat his father at chess when he was 7, understood the bytes-and-basics of computers by the time he was a teenager. He received his first computer at age 9, a Commodore 64, and read manuals, mastered the computer language and wrote his own software for games. As a high school senior in Sarasota, Fla., Klaus received an internship...
from the Department of Energy to work on the project at the Lawrence Livermore National Labs, where he developed a software application to check the lab’s computers for vulnerability.

A dean’s-list engineering student at Georgia Tech, Klaus developed another security software application during his sophomore year in 1994 and began freely distributing it as shareware over the Internet. The application, which uncovered weaknesses in computer systems to keep hackers at bay, was so well received that in the spring, he began to sell versions of it.

Demand for the software blossomed, and near the end of his sophomore year, Klaus dropped out of Tech. He moved into the guest room at his grandmother’s house in Marietta, Ga., incorporated his company and launched Internet Security Systems.

The Hackers’ Nemesis

Tom Noonan, vice president for worldwide operations marketing at Dun and Bradstreet Software in New York, was intrigued by the shareware Klaus was posting on the Internet. He knew of no other tool at the time designed to fend off hackers.

A 1983 mechanical engineering graduate of Georgia Tech and native Atlantan, Noonan noted that the software originated from a Georgia Tech domain.

Through a friend, Noonan arranged to meet Klaus in 1995. The 20-year-old college kid and 34-year-old corporate executive hit it off. In addition to his own expertise in computers, Noonan had experience in electronic commerce. And both men shared a confidence that commerce on the Internet was about to explode.

Klaus took charge of creating the company’s innovative products as chief technology officer and hired Noonan to run ISS’s operation. Noonan, who earned a business degree from Harvard University after graduating from Tech, had spent eight years developing automatic control systems for computer-integrated manufacturing—using computers and software to automatically control production.

“The first day we went out to NASA,” Klaus said. “We were going to do a demo. I told Tom I thought they were going to buy some software, but he could help me negotiate with them. The administrator told us the system was all secure and ‘You’re not going to find anything.’ When we

Failure

What doesn’t kill you, makes you stronger

The spectre of failure is “a beast you have to stare right in the face—sometimes more than once,” says Tom Noonan, president and CEO of Internet Security Systems.

“I look at very few things as failure,” Noonan says. “What doesn’t kill you, makes you stronger if you let it. Attitude is the critical factor in learning from defeat.”

Most people who achieve success have experienced failure and overcome it, he says.

“Successful people learn from mistakes and failures—accept them,” Noonan says. “If you have not failed, you probably have not succeeded. Funny how that works.”

Learning from mistakes, he says, means putting the experience in perspective. “Very few bad decisions render unrecoverable results,” he adds.

“I have always had this attitude that I have a good education, am well respected, and I have a good family. If all else fails, I can get a job anywhere. So what’s the real downside of not taking the risk to pursue something you believe in passionately?

“I have a motto: ‘Get out on the end of the limb because that’s where the fruit is!’ Gotta be bold if you are to make something happen.”
There is a culture at Internet Security Systems that President and CEO Tom Noonan calls “Go, ISS!” Noonan leads the way, celebrating his enthusiasm for the company wherever he goes—certainly wherever he drives. “Go ISS” is broadcast on the license plate on the front of his car.

“All you have to do is walk through our doors and you feel it,” Noonan exults. “It means we want to be the most well-known, valued and trusted security company in the world. We’re passionate about that; we believe we can be. We have huge respect for the individual. We take risks. We’re innovative. There is a tremendous loyalty.”

Noonan says employees are held in high esteem. In its four-year history, the company has only lost a few employees.

“People are the key,” Noonan declares. It’s now an ISS adage that Noonan acknowledges “stealing” from John Imlay, IM ’59, a former employer of his who is now an ISS board member.

“Of the more than 350 employees at ISS, I have interviewed more than 200,” Noonan says. “I ask them how they strive in chaos. Can they stand things being totally disorderly? Our market is growing so fast, and our company is growing so fast, that to be innovative you can’t have a lot of bureaucracy, process and structure.

“We have tremendous people who are very competitive—a lot of them are Georgia Tech grads who are smart and hungry,” Noonan says.

“Every employee is a stockholder. We don’t take that lightly. I look at stockholding as a responsibility—not just a way to make money. But ISS employees have made a lot of money on paper. The employees hold a major portion of the company’s stock, which is worth over half-a-billion dollars today. This company has created a significant amount of wealth.”

Noonan encourages communication among employees—and to bring them together, he holds an employee luncheon every Friday.

“We have a big company lunch, and we talk about what we are doing,” Noonan says. “Communications are high. We have company events all the time.”

Among those events was a company outing to see the Georgia Tech-Florida State football game. “Unfortunately, Georgia Tech lost, but we had almost 300 ISSers and their spouses sitting down on row one behind the Florida State bench, just harassing the heck out of those guys.”

“We have tremendous people who are very competitive—a lot of them are Tech grads who are smart and hungry.”

Enthusiasm for Success

‘People are the key,’ Noonan says of ISS
The stock soared. “At one point, the company was valued at $1 billion, which is just amazing.”

The ISS software scans corporate networks to detect hacker intrusions. A pioneer in the concept of adaptive network security, it is now the world standard for managing security in an age of electronic commerce.

As president and chief executive officer of the start-up company, Noonan put together a business plan, and in August 1995, he began raising venture-capital funding—a process that took about six months.

“I could not get Atlanta investors to give me the money I wanted,” Noonan says, and relates a visit with John P. Imlay, IM ’59, chairman of Imlay Investment, for whom he had once worked and who is now an ISS board member. “I asked John for $5 million. He said, ‘Noonan, no one in this city is going to give you $5 million. Not on your life. I’ll give you $100,000.’ Which I took.”

For more than a year, neither Klaus nor Noonan received a paycheck from ISS.


“We were very bold about our marketing,” Noonan recalls. “Our slogan was: Internet Scanner lets you find your network security holes before the hackers do.” Their marketing literature stressed the vulnerability of computer systems. “Our brochures were full of holes, our business cards were full of holes—and people remembered us.”

No Place to Hide

The media took notice as well. The two-person company with its innovative software and aggressive marketing was covered in the Wall Street Journal and other business publications.

But the expenses of a start-up were much greater than profits for a time.

Leah Lochiel, Noonan’s secretary, was the first employee hired. Now located at 6600 Peachtree-Dunwoody Road in prestigious Embassy Road, the fledgling Atlanta company of four years ago was situated in the back of a warehouse in Norcross, Ga.

“Whenver contractors or others would come to collect a bill, Leah would tell me when they were there, and I’d go hide,” Noonan says. “We had no money.”

In December 1995, the company had grown to 10 employees, but there was no revenue to make payroll. Noonan had invested everything he owned into the company.

Taste of Success

‘Stinky’ old loafer substitutes for prostitute’s shoe

On one of the bleak days when Internet Security Systems creditors were at the door and expenses were outstripping revenues, President and CEO Tom Noonan turned in despair to his secretary and made a dubious vow.

“If we ever make money in here, I’ll drink champagne from a prostitute’s shoe,” Noonan proclaimed. “I am that desperate.”

The secretary, Leah Lochiel, laughed, but she didn’t forget. And neither did some other employees.

When the financial tide turned on Feb. 3, 1996, an ISS engineer brought in some homemade brew to celebrate, and Noonan’s day of reckoning had come.

“I obviously didn’t have a prostitute’s shoe to drink out of, so I took off my old loafer, which had a hole in it, and poured some cider in my stinky ol’ loafer and I drank it,” Noonan laughed. “We passed it around, and everybody drank out of it.”

At the annual Christmas party Noonan hosted at his home, Lochiel and a couple of other employees presented Noonan with a pair of purple, high-heel shoes with a gaudy bow that ideally suited the occasion.

Noonan drank a champagne toast from the shoe, and the ISS employees followed suit. Since then it has become an annual Christmas tradition.
I had spent all of my family's money. I had
spent all of my kids' college funds. I had spent my
401K; I had 27 VISA cards with cash advances on
them, and we were out of money. The darkest
dark came when my wife found out I had with­
drawn the last $4,000 that she had in savings. That
was not a good day."

The week got better. A $25,000 check arrived
from NASA.

In January 1996, ISS raised its first venture­
capital funds, led by $3.6 million from Greylock of
Boston and Sigma of Menlo Park, Calif. "That was
the spark that we needed to get going," Noonan
says. ISS generated about $200,000 in total revenue
in 1995. Noonan told the dozen employees the
company would generate $5 million in revenues
in 1996.

It was a huge goal, he admits, but by the end of
the year, the company had grown to 41 employ­
ees—including a number of engineers—and had
done $4.6 million in revenue. ISS also opened a
European headquarters in Brussels, Belgium.

And ISS developed two new products: System
Security Scanner, a system-based vulnerability­
detection product, and RealSecure, the industry's
first software-only intrusion-detection system.

"RealSecure has redefined the security industry
globally, and it has really helped to put us on the
map," Noonan says.

Mapping Growth

The growing company was consuming capi­
tal, and in the fall of 1996, Noonan was
again seeking venture capital. The second
round was much easier. In January 1997, ISS
raised $5.2 million from Kleiner, Perkins,
Caufield and Byers, one of Silicon Valley's pre­
miere venture-capital firms—an investor with a
reputation for backing such winners as
Netscape (recently acquired by America Online
for more than $4 billion), Sun and Compaq
when they were small. The Byers in the firm's
name is Brook Byers, EE '68.

Noonan also negotiated a valuation of
$50 million on ISS—a remarkable achieve­
ment for the 2-year-old company. And
AT&T came aboard as one of the com­
pany's strategic customers and investors.

Noonan announced to his employees
and investors the company had to grow
from $4.6 million to $14 million—more
than tripling its size. The company fin­
ished the year on target, with 141 employ­
ees and approximately $14 million.

In November 1997, Klaus and Noonan
told the board of directors they wanted to
take the company public. It was time,
No Spare Time Job

Starting a business requires huge commitment

Internet Security Systems is Tom Noonan’s third start-up company—he started two companies in Boston: Actuation Electronics and LeapFrog Technologies.

"Nothing went wrong per se," Noonan says. "They were great learning experiences for me at a time when I was soaking up life's lessons at a blinding speed. I was young, preoccupied with a full-time job, graduate school, and had this burning desire to create these things in my spare time."

Both companies grew, and Noonan discovered he didn't have time to manage them.

"LeapFrog was sold, and Actuation was shut down after we received our biggest order," Noonan says. "There is no way to build enduring companies in your spare time. They require incredible investment and focus, a huge commitment to see it through, passion and an unwavering belief that these technologies can change the world. You cannot do that in your spare time."

"In the early days at ISS, I committed at least 100 hours per week to building the company. Today, I still spend at least 80 hours per week."
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A Culture of Cooperation

By Victor Rogers
Photography by Gary Meek

The first step in any entrepreneurial enterprise is developing a product. In high-tech's case that means research. And in Georgia Tech's case that means interdisciplinary, collaborative research.

Starting with a base of top-notch faculty and students working without barriers, Tech has been able not only to attract many research dollars, but many research partners as well.

Tech's focus on recruiting excellent undergraduate and graduate students and outstanding faculty is one key to the institute's success in research. "We have outstanding students and some of the best faculty in the entire world," says Dr. Charles Liotta, vice provost for Research and dean of Graduate Studies. "Therefore, we are able to conduct world-class research."

In fiscal year 1998, the amount of Georgia Tech's total research awards was approximately $190 million. "Unless you have world-class students and faculty, you could not possibly accomplish these results," he adds.

To illustrate his point, Liotta gives two examples: Dr. James Meindl and Dr. Robert Nerem. "Jim Meindl in the Microelectronics Research Center is an example of our world-class faculty. He has provided the leadership for Georgia Tech being awarded a Focus Center Research Program in microelectronics."

The Focus Center Research Program will find ways to continue improving microchip performance. A consortium of six universities led by Georgia Tech will receive up to $19.5 million over the next three years to research radically new architectures for microchips.

Likewise, Dr. Robert Nerem, director of the Petit Institute for Bioengineering and Bioscience, helped attract the National Science Foundation funds to allow an Engineering Research Center for the Engineering of Living Tissues. Tech will work with Emory University in that effort.

In addition to providing excellent educational and research opportunities, the two new centers will have a long-range economic impact not only on the state of Georgia and the Southeast, but also on the nation and the world, according to Liotta.

"These centers are where new technologies will come from, and we are among the leaders in these areas," he said.

Interdisciplinary Collaboration

The Georgia Tech culture is one of interdisciplinary research," Liotta says. "Georgia Tech is not a collection of colleges, schools and the Georgia Tech Research Institute (GTRI). Georgia Tech is these components linked together, overlapping and fostering interaction and interdisciplinary activity."

Real world problems rarely, if ever, fall under the auspices of a single discipline. Therefore, finding solutions and taking advantage of opportunities requires interdisciplinary and multidisciplinary activities. Tech lowers barriers between its various components to encourage faculty interaction, according to Liotta.

"I'll use myself as an example," Liotta says. "I'm in the School of Chemistry and Biochemistry, and I have a great deal of interaction with Professor Charles Eckert in the School of Chemical Engineering. I'm the chemist; he does the reactions. He's the engineer; he understands the processes. Together, our work is almost seamless. There's no barrier. We publish together. We apply for research funding together. Our students work together."

The classical model for most universities is to have individual buildings for individual disciplines, according to Liotta. In contrast, Georgia Tech is moving toward the co-location of disciplines in order to allow faculty to interact.

"The Georgia Center for Advanced Telecommunications Technology has computer scientists, electrical engineers and researchers from GTRI co-located in the same facility, often on the same floor, so they can interact," says Liotta. The Institute for Bioengineering and Bioscience (IBB), under construction, will house biologists, biochemists, chemical engineers and mechanical engineers in the same building. The Environmental Science and Technology Building (ES&T), scheduled to begin construction in 1999, will house environmental science faculty, chemical engineers and
Dr. James Meindl, director of the Microelectronics Research Center and Pettit Chair in Microelectronics.
We wanted a partner, not just to hand over the technology." At least 26 companies have expressed interest in the system.

Georgia Tech projects in microchip research demonstrate Tech's ability to collaborate with universities all over the nation. Tech also has teamed with other Georgia universities on numerous projects, including the Electronic House Call system with the Medical College of Georgia (MCG).

The Electronic House Call system allows the monitoring of patient vital signs over distance with audiovisual support. Researchers say the system has a huge potential market for assisted-living centers, nursing homes and even prisons. Atlanta-based CyberCare Inc., under the leadership of CEO John Haines, is working with MCG and Georgia Tech to commercialize and distribute the system.

Michael F. Burrow, senior research engineer and director of Georgia Tech's Biomedical Interactive Technology Center, is working with CyberCare in overseeing technical development, and a consultant was called in to develop a business plan.

"We also worked with patent attorneys to identify unique features about our technology and to determine which areas we could or could not protect," Burrow said, adding that both Tech and MCG want to stay a part of the project. "We wanted a partner, not just to hand over the technology."

At least 26 companies expressed interest in the system.

The case paints a picture of a new model for industry research that's evolving today. Companies frequently turn to universities for solutions to specific problems. Liotta calls the evolving model "industry-academic partnerships," in which industry recognizes the importance of the research and the education of the student.

"The industrial company, in addition to providing dollars, provides interactions with the faculty and students to help in the education process. Remember, our most important product is our students, and industry is looking to hire our students."
Technology transfer, once regarded by academia with misgivings, is bringing university research to the commercial realm. In 1996, Georgia Tech ranked No. 33 in technology-transfer income out of 131 institutions surveyed by the Association of University Technology Managers.

And the climate for support of commercialization at Tech is better than ever, according to Wayne Hodges, director of the Economic Development Institute and the Advanced Technology Development Center (ATDC). "This is the most supportive environment for commercialization and entrepreneurial activity that I've ever seen."

Until recently, some at Tech thought commercialization would detract from the Institute's primary focus on education and research. "Our primary mission is still education," Hodges says. "Research is still an important mission. However, making students aware of opportunities surrounding entrepreneurship and giving them opportunities to develop new products is part of the education process. What we needed was a mechanism to encourage faculty members to look at commercialization opportunities."

To aid this goal, ATDC's Faculty Research Commercialization Program—now in its eighth year—awards start-up grants to faculty from Georgia's top research schools: Clark-Atlanta University, Emory University, Georgia State University, Georgia Tech, the Medical College of Georgia and the University of Georgia. The one-year grants range from $30,000 to $100,000, modest amounts, says Hodges, but such targeted funding can have a dramatic effect on a researcher's prospects of producing a marketable invention.

The grant to Dr. William Ribarsky, a senior research scientist with Tech's College of Computing, for example, enabled him to convert existing terrain-visualization software to PCs in time to take advantage of rapid growth in the 3-D video capability of personal computers.

"When you get money like this at opportune times, you can really develop some capabilities that you couldn't otherwise," Ribarsky says.

In 1998, a faculty commercialization grant helped Dr. David N. Ku, a professor in mechanical engineering at Tech, kick-off his new company, Restore Therapeutics, which markets a patented new biomaterial that could play a significant role in orthopedic and other medical-restoration work.

Two Tech projects funded in 1999 are:

- Knowledge Worker System in Construction Enterprises, a project of Dr. Godfried Augenbroe of the College of Architecture and his principal investigator, Michael D. Jones of the Construction Research Center.

Technology transfer generally takes one of two roads: licensing or start-up companies. Licensing involves an agreement with an existing corporation, an easier deal for both university and researcher, with some return assured. With a start-up company, the risks and rewards are greater.

"With licensing, you get a certain number of dollars as a reward," says Dr. Charles Liotta, vice provost for Research and dean of Graduate Studies. "But when Tech takes equity in a start-up company, and that company becomes large and profitable, Georgia Tech will profit from it, and so will the economy."

And so will Georgia Tech students, says Liotta, when they get an education "in an environment where they not only see the fundamental science and engineering, but they see it going into the real world in terms of start-up companies."

At an institution that was conceived, in part, to create an economic impact in Georgia, the link between research and commercialization is becoming more natural. "One of the benefits of conducting applied research is seeing ideas move from the laboratory into the commercial sector," says Michael F. Burrow, senior research engineer and director of Georgia Tech's Biomedical Interactive Technology Center. "I cannot overemphasize the importance of protecting the intellectual property and filing patent applications on technology when the goal is moving technology from the laboratory to the marketplace." — Victor Rogers GT
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Takin’ it
to the Streets

By Shelley Hughes

Already widely known for its collaborative, cutting-edge research and development in telecom technology, The Georgia Center for Advanced Telecommunications Technology (GCATT) also provides a lesser-known service—bringing that new technology to the world. "Our goal is to fill our incubator with companies that come out of our research labs. We want to complete the life cycle, create embryonic ideas, nurture them, and then send them out to the world," says J. Michael Cummins, director and chief executive officer of GCATT.

GCATT’s major activities include promoting public policies that advance development of information-industry companies, technologies and services; linking Georgia’s research universities through collaborative programs; and developing research and commercialization partnerships. World-class scholars at leading Georgia universities create new knowledge, and GCATT helps transform that new knowledge into industry growth.

GCATT works to commercialize innovations in four ways:

- Accelerating the introduction of technologies to the marketplace. By linking research expertise with business experience, GCATT stimulates the development of high-impact start-up companies.
- Helping entrepreneurs bridge the gap between a business idea and reality. The Linking Investors to Georgia High Technology (LIGHT) series offers informative networking opportunities for interested parties from academia, corporate start-ups and the financial world.
- Supporting high-tech start-up companies. GCATT includes an entrepreneurial-venture incubator that provides business assistance to start-ups. The close proximity of start-up companies and research scientists in GCATT stimulates collaboration, enhancing the performance of both entities. And GCATT helps start-ups find the right business connections.
- Developing research and commercialization partnerships with established information-industry companies. Lucent Technologies, BellSouth, Hitachi and other industry leaders leverage research capabilities at GCATT.

The Midwife Role

Companies not only use the transferred technologies to enhance their growth, but also benefit from updates on new technologies and opportunities to get involved in emerging companies. The Technology Development Partnership offers grant funding for joint corporate-university research. The result is a fountain of technical innovation that becomes a powerful stimulus for high-tech job growth in Georgia.

"There is stiff competition for venture capital in today’s market," Cummins says. "To successfully compete for dollars, we need to look to untapped opportunities. Very few incubators play the midwife role, and this just might be the wave of the future. We need to find technologies that haven’t been turned into companies yet and then commercialize them."

An example of a new technology is the haptic lens. Made of a malleable clay-like substance, it could be used by physicians to detect cysts. Shoe manufacturers could use it as a fitting tool, or automobile manufacturers could use it in vehicle design.

"The haptic lens has many applications that have real potential," Cummins says. "It is our job to determine what is the most viable option. To do this we need to gain better knowledge about the marketplace, further develop the technology, analyze the marketplace, develop a business plan and find an entrepreneur to run the company."

Telecommunications, computing, cable TV and consumer electronics are merging into a new and exciting industry. By bringing together researchers, corporate developers and entrepreneurs, GCATT plans to be at the center of this activity. GT

Shelley Hughes is a writer in Georgia Tech’s Office of Communications and Public Affairs.
J. Michael Cummins, director and CEO of GCATT.
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Wayne Clough has a vision of Georgia Tech in the 21st century. It's a vision of a vibrant, verdant campus where students and faculty, engineers and entrepreneurs work together across disciplines, without boundaries real or imagined. It's a vision of glimmering towers and greenery where the crumbling hulks of an industrial age once shadowed the campus, of scientists and technicians in high-tech shops holding the promise of new technological wonders where dank alleyways once held only despair.

It's a vision of the future firmly founded in the past, of harvesting the rich fruits of a century's careful cultivation.

"Georgia Tech was founded to help the state of Georgia move out of the agrarian era after the Civil War towards an industrial era," Clough says. "That was at the turn of the 19th century. We're at the turn of the 20th century now, and Georgia Tech can play that same role in a modern context as we move into a new economy."

That new economy holds near inestimable potential, says Clough, CE '63, MS CE '65. High tech accounted for 40 percent of the economic
growth in the past decade, and there are 350,000 jobs vacant in the industry nationwide—jobs that pay twice the wages of typical manufacturing. And literally every existing industry—from textiles to textbooks—needs newer, better technology to compete in a global market.

“If Georgia doesn’t grab its piece of the information-technology sector, then Georgia has missed the economic wave of the future,” Clough says. “It has to have a piece of that.”

A Unique Model for the Future

Since the early 1980s, leadership at Tech, Atlanta and the state has coveted California’s Silicon Valley, seeking ways to emulate its high-tech success. That’s no different today, but Georgia Tech and environs don’t fit the circumstances that made Silicon Valley and similar areas like the Research Triangle or Austin, Texas, so desirable for high-tech industry.

For instance, these locations had access to huge tracts of undeveloped land, so they were able to pick and choose the industrial partners they wanted. With key players in place, associated start-up companies started “popping up all over the place.”

“We don’t have the property, and we’re in the middle of a major urban center, so we have to be more creative about how we’re going to get there,” Clough says. “We have lots of ideas, and we’re working with our neighbors. We have to be more collaborative than Stanford had to be in its role as the central agent in developing Silicon Valley.

“The model for the future has to involve an innovative approach that looks to alliances between state government, federal government, business and other universities. Which university is going to have the best chance to win in that new model? Those that know how to create these alliances.”

While efforts thusfar have had some success—"Tech Alley," a collection of small high-tech companies, is beginning to carve a corridor through Atlanta’s Midtown—the campus is bordered by blocks of abandoned, decaying buildings and scurrilous activities. It’s a problem neither Tech, nor the city or the state alone can overcome.

“But private industry can,” Clough says. "If we make ourselves such a desirable place to be close to, major companies will come in, buy that property and build beautiful facilities there. When they do that, it creates a wage base for the city that doesn’t exist today, a tax base for the city; it creates jobs for our citizens; it brings restaurants; it brings culture, and it brings opportunities for Georgia Tech.”

Breeding a Culture of Success

Achieving that vision is the driver behind and will be the culmination of myriad initiatives: the “Industries of the Mind” effort by the Metro Atlanta Chamber of Commerce, the state’s project to attract new companies and engineers to Georgia, Tech’s Capital Campaign, the regional engineering program, and the continued efforts of such already successful economic engines as the Advanced Technology Development Center and the Georgia Center for Advanced Telecommunications Technology.

But the real key is encouraging the entrepreneurial spirit of Georgia Tech’s most prized commodity—its students and faculty.

“Each person sitting in that class could be another Bill Gates, could be a Hewlett, could be a Packard. These are the kind of individuals we have here.

“The other side of it is that our faculty are people who generate ideas. And many of these ideas can be the seeds for future businesses, revolutionary businesses.”

As business becomes more reliant on technology, those engineers, scientists and managers who enter the “Real World” must have an understanding and appreciation of the entrepreneur’s creativity and willingness to take risks. Even those graduates who follow a traditional path to a large company must realize they could be called on to reshape it, and they all must grasp the potential of ideas to create new businesses. Likewise, faculty must be aware of the linkage between discovery and the potential to use creative ideas in commerce.

“We have a multifaceted culture at Georgia Tech that impacts our students and what they become in their careers. Ultimately, the success of our alumni in business affects the reputation of Georgia Tech, because people will hear more about you if they see before them products that are the outgrowth of our graduate’s ideas,” Clough says. “And bringing this closer to home, the growth of new companies or the location of new companies near or adjacent to us will impact our future. Instead of having run-down warehouses, it’s a lot better to think you’d have shining buildings with very smart people who’ll work with your faculty and hire your students.”

Facing Challenges with a United Front

A glittering vision of Georgia Tech, Atlanta and Georgia in the next millennium must be tempered with the realities of today. There are many roadblocks along the way to a high-tech mecca, and the key to success is cooperation.
"You can't have this kind of economy, and you can't have the right life for your children and grandchildren if you've got major traffic jams, pollution problems and water problems," says Clough, a member of the study group that came up with a regional transportation strategy for metro Atlanta. "Knowledge workers don't go to places like that. Knowledge workers look for quality of life; they look for places where there is a critical mass of people like them."

It's no secret that Atlanta's quality of life has deteriorated in two decades of sprawling, uncontrolled growth. The area is habitually in violation of Environmental Protection Agency air-pollution standards, and it will face serious restrictions in a 19-to-20 county area unless the air gets cleaner. Metro commuters log more miles than in any other American city. The Chattahoochee River—source of drinking water for millions—has become one of the nation's most-endangered waterways.

In Washington, Transportation Department officials call Atlanta a poster child for suburban sprawl. Internationally, the city's once glittering image is in danger of tarnishing. In fact, Atlanta dropped to a distant fifth after three years atop the Association of Foreign Investors in Real Estate's rating of desirable real-estate markets.

"Atlanta is probably going to continue developing no matter what. It can either be a sprawling, congested community, or it can become a model of the future," Clough says.

To become that model city, Atlanta—indeed the state—must develop alternatives to traffic gridlock such as light rail. Education at the elementary and secondary level must be dramatically improved. Jobs must be added to stop the cycle of poverty in many areas of the state.

These issues have been identified by incoming Gov. Roy Barnes as high priorities for his administration. Tech has offered its services to help the state where its assistance is needed, including in transportation and regional planning, environmental engineering, and economic development.

"Georgia Tech can be part of the solution," Clough says. "If we can get the metro chamber; the Department of Industry, Trade and Tourism; Georgia Power; local foundations; and our sister institutions working together, then we've got the horsepower needed to tackle the tough problems facing us."

"Georgia Tech has its own mission, and that is to become a world-class educational institution. But we won't be a world-class institution if we don't protect our quality of life and revitalize the neighborhoods around us. In my lifetime we're not going to solve all these problems. There's just no end to the work that's got to be done.

"But the opportunities are tremendous." GT

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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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<td>3M Company</td>
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<td>Abbott Laboratories</td>
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<td>Air Products &amp; Chemicals</td>
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<td>Alcoa</td>
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<td>Allied-Signal</td>
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<td>American Express</td>
<td>Merck &amp; Co.</td>
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<td>Amoco Corp.</td>
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<td>Bechtel</td>
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<td>Bellcore</td>
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<td>BellSouth</td>
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<td>Boeing</td>
<td>Retirement</td>
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<td>Burlington Industries</td>
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<td>Cabot Corporation</td>
<td>Novartis</td>
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<td>Carolina Power &amp; Light</td>
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<td>Celanese Acetate</td>
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<td>Cooper &amp; Lybrand</td>
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<td>Dow Chemical</td>
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<td>Duke Energy Corporation</td>
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<td>Ernst &amp; Young</td>
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<td>Florida Power &amp; Light</td>
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<td>Hercules</td>
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While Georgia Tech's technology incubators are busy sending new start-up companies into the marketplace, College of Management Professor Terry Blum is teaching the future captains of those industries how to survive and thrive in the entrepreneurial arena.

A professor of organizational behavior, Blum is director of the DuPree Center for Entrepreneurship and New Venture Development, and holds the Tedd Munchak Chair in Health Care Management and Entrepreneurship.

“Our core goal at the DuPree Center is to coordinate and integrate the academic entrepreneurship programs on campus—the research and the curriculum,” Blum says. “We provide opportunities to mainstream entrepreneurial thinking into engineering management and entrepreneurship, and also to link up with the Advanced Technology Development Center (ATDC) or the Georgia Center for Advanced Telecommunications Technology (GCATT). We're providing students to work in these entrepreneurial settings or in their own new ventures.”

As a graduate student at Columbia University, Blum began investigating the relationship between sociology and science under the direction of professor Robert Merton, founder of the sociology of science.

“The combination of those two disciplines really came together in a way that made one look at the issues related to technology, entrepreneurship, and the organizations that would form and develop from that,” Blum says. “I cut my teeth on intellectual property patents and the accumulation of scientific knowledge, and how that was influenced by social factors.”

Because of her extensive research in health care management and experience in biostatistics, Blum was chosen by the National Institutes of Health to serve on their study sections and review groups both for small business innovative-research grants as well as the standard research grants. As she and her colleagues studied people in occupational groups and organizations, a “self-employment” category was always a primary focus.

“At that time, we didn’t call them entrepreneurs, we called them 'self-employed,'” Blum says. “But, even though I never called it ‘entrepreneurship,’ it became information that was really important to understanding the birth and death of organizations.”

Blum’s definition of entrepreneurship now extends well beyond its function as an organizational subculture.

“It is the seizing of an opportunity to create value—to do novel things,” she says. “It’s more than just new venture creation for me. That’s the core. But entrepreneurship is the flexibility, the risk-taking, the personality characteristics, knowledge and skills that are necessary to exist in an innovative, growing company—whether you started it or not.”

Of course, most of the students she teaches have designs on an independent venture. But Blum debunks the myth that all of today’s entrepreneurs are kids who became millionaires overnight.

“A lot of them have gray hair and have failed several times before making it,” she says. “So it’s a lifetime commitment.”

To encourage her “risk-takers,” she echoes the mantra of Center namesake and Morgan County neighbor Tom DuPree that exclaims, “Dream big!”

“Acquire the skills which will improve the chances that those dreams are going to come true,” Blum says. “If you fail, try again. Be persistent.”

And, along with that persistence, she says, be careful to cultivate “social capital.”

“A lot of people think that entrepreneurship depends only on financial capital,” Blum says. “Everybody keeps mourning that there are not enough financial resources. But I think there’s pretty good evidence showing that the social capital—the social networks that are in place ahead of

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**The Blum File**

- **Born:** Dec. 25, 1953, in Brooklyn, N.Y.
- **Education:** B.A. in sociology from Brooklyn College, 1976; M.A., Columbia University, 1978; M. Phil., Columbia University, 1980; Ph.D. Columbia University, 1982.
- **Personal:** Husband; Dr. Paul M. Roman, a professor at the University of Georgia; two children: Luke, 8, and Faith Elisebeth, 7.
- **Achievements:** "Thriving at Georgia Tech," Blum says. Appointed to study sections (initial review groups) at National Institutes of Health. Served on a National Academy of Sciences study panel on Drugs in the Workplace.
- **Leisure Interests:** Riding her Peruvian Paso mares, Trella and Gallina. “I also love to be near water, either at Seaside, Fla., or Lake Oconee in Georgia, where we float around on a pontoon boat.”
time—will get you to the financial capital. They'll also get you to the management teams that you're going to need to make the commercialization a success. That's why what we're doing at Georgia Tech is so important. We're trying to generate social capital to let people know that we are a major player in the development and the commercialization of these technologies.”

One of the social networks Blum refers to is the current collaboration between Georgia Tech and Emory in groundbreaking biotechnology research.

“It's really exciting to be in Atlanta and in Georgia at this time when we're focusing on telecommunications and biomedical technology,” Blum says.

“The public-private partnership with Georgia Tech and Emory with the biomedical engineering research center is going to make an incredible laboratory for our students to think about commercialization of biotechnology. That's going to make a difference in the health services that people are going to receive. I have students in my classes who are going to be able to grow tissues that will replace the need for organ transplants, which are in short supply.”

It is this cooperation itself, Blum says, that exemplifies entrepreneurship because “it's a novel, unusual approach for people to implement that.”

“Multi-disciplinary, multi-institutional partnerships are very necessary because no one group has everything that's needed. In universities, our course is set by the past—how we are organized into departments and colleges—and the future really requires the breaking down of these disciplines. You need information from the various sources to change the questions that people are asking.”

Blum enjoys the fact that she sees that spirit in existence at Georgia Tech, in an entrepreneurial environment that “encourages its faculty and students to try new things.” This gives her the freedom to convey the one lesson she hopes her students hold onto.

“Carpe diem,” she says. “Seize the day.”
Victory Dance

"Toe meets leather." The late Al Ciraldo's classic opening line made the perfect close for a game that will be long remembered in the storied rivalry between the Yellow Jackets and Bulldogs. Brad Chambers kicked a 35-yard field goal in the waning seconds to give the Jackets their first win over Georgia this decade. Chambers learned the kick was good the hard way as holder Brett Basquin celebrated by leaping into his arms. "I think I have a bruise on my ribs," Chambers said.
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