



**Annual Report of Institutional Progress  
2006-2007**



G. Wayne Clough, President

**Georgia Institute of Technology**  
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This year has confirmed the growing opportunities for Georgia Tech as the role of technology grows in society and traditional boundaries dissolve. Where in the past the Institute had little role in health care, the rapid emergence nanomedicine, bioinformatics, medical sensors, high tech prosthetic devices, and use of advanced health information systems have opened new areas of involvement. With the increased importance of supply chain systems in the retail sector, Georgia Tech is now conducting logistics research for firms like Home Depot, Lowe's, and Wal-Mart. And, the almost universal acceptance of sustainability has created new partnerships in a wide range of areas and entities that were not possible earlier.

The emergence of a global economy based on innovation has also led to dissolution of regional and national boundaries that used to define Georgia Tech. Over the past decade, global partnerships have been forged based through strategic linkages in France, Ireland, Singapore and China. Exploratory discussions are being conducted with parties in Hyderabad, India about the establishment of engineering and computing graduate degree programs.

Georgia Tech seeks to optimize its growing opportunities to improve the educational experience of its students, enrich and diversify the research horizons of its faculty, and enhance its ability to serve the University System of Georgia (USG) and the state. In all of these activities the Institute is mindful of the new Board of Regents Strategic Plan and seeks to insure there is a good fit.

**Section 1: Annual Progress in Assessing Institutional Effectiveness**

Assessment is integrated into all Institute efforts, but this year emphasis was placed on tracking the effectiveness of the SACS-approved Quality Enhancement Plan and the two new academic programs that define it, the International Plan and the Undergraduate Research Opportunities Program (UROP). Feedback from these activities has been used to guide their implementation and the early results are positive. Both programs have strong participation levels, and both have already received national recognition. The Institute received the prestigious Paul Simon Internationalization Award

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for its international academic programs including the International Plan, and the UROP was cited as an “Academic Program to Look For” in latest *U.S. News and World Report* university rankings issue.

The International Plan seeks to increase the number of undergraduate students who graduate with global competence in the practice of their major. This initiative involves a unique degree-long program that integrates international studies and experiences into any major at Georgia Tech. Graduates of the program will be proficient in a second language; be knowledgeable about comparative international relations, the world economy, and the socio-political systems and culture of at least one other country or world region; and be able to practice their discipline within an international context. Among the desired outcomes is achieving Georgia Tech’s strategic goal of having 50 percent of its undergraduate students graduate with an international experience by 2010. In 2007, the program’s second year, the International Plan included over 200 students and 20 academic programs.

The UROP seeks to increase the number of undergraduate students participating in research, encourage longer research experiences, and improving the quality of these experiences through faculty mentoring. The complementary Research Thesis Option is designed for those students who seek an intensive research experience and possibly a research career. Among the desired outcomes is that 60 percent of Georgia Tech’s undergraduate students will graduate with research experience by 2010. During 2007, over 1,100 students took part in organized research activities on campus, either for credit or for pay.

In addition to assessing special initiatives, Georgia Tech is committed to following the USG’s prescribed schedule for Academic Program Review (APR) by conducting a strategic evaluation of each academic program every five years. We have organized our five-year program degrees with external committees evaluating programs within schools and colleges. A new Office of Accreditation and Program Review will work with units as they prepare for the program reviews. During 2007, the following programs took part in the comprehensive program review process: Building Construction;

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Chemistry and Biochemistry; Computer Science; History, Technology and Society; Industrial and Systems Engineering; Management; Mechanical Engineering; Physics; and Psychology. The review involves: the preparation of a program self-study, a visit and report by an external review committee, an evaluation of the process and materials by the appropriate Institute committees, a plan outlining the actions to be taken based on the results of the review, and an annual progress report.

A program that recently completed the APR process, the Sam Nunn School of International Affairs, was cited by its visiting team for the quality of its graduate and undergraduate programs and positive program growth. Also the quality of its faculty was praised as evidenced by teaching evaluations, publications, and national and international awards as well as consultancies and requests to provide expert testimony to government agencies. Reviewers supported the School's proposed Ph.D. program which was recently approved by the Board of Regents. Concerns were expressed about the large size of undergraduate courses, a consequence of the program's continuing growth. In response to those concerns, the School is working to reduce the size of classes for majors.

Assessment in the College of Computing focused on a new curriculum for its Bachelor of Science in Computer Science (BSCS) degree. The Threads™ curriculum is an innovative approach to computing education focused on producing graduates prepared to meet the challenges of a global and pervasive information environment. As a result of feedback from alumni surveys, the College is proceeding with the development of an Entrepreneurship track to encourage students who want to obtain a deeper understanding of business processes as it impacts computing development and operations. The Threads approach has been cited as a national model and was praised in the second edition of the book *The World is Flat*, by the author Tom Friedman. Further evidence of the impact of the new curriculum is that the College of Computing has experienced a growth in enrollment and applications while computer science programs at other universities have seen declines.

The Colleges of Engineering and Computing began developing plans for the next comprehensive review by the Engineering Accreditation Commission of ABET in the

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2008 fiscal year. New degree programs approved by the Board of Regents include (Professional) MS in Systems Engineering; dual MS in ISyE with Shanghai Jiao Tong University, and the MS in Electrical and Computer Engineering with Nanyang Technological University (Singapore).

The Division of Student Affairs hired its first Director of Research and Assessment and began development of an assessment plan unique to student affairs. Components of the plan consisted of: (1) Learning and/or Operational Goals; 2) Outcomes; 3) Evaluation Strategies; 4) Methods for Disseminating and Using Information for Improvement; 5) Summary of Results; and 6) Actions Taken. In the spring of 2007, each unit within the Division completed the assessment cycle by summarizing findings and identifying ways to use the data for improvement purposes. Overall, the Division reported 61 goals of which 41 percent were Learning Goals, and 51 percent Operational Goals. Relative to stated versus implemented goals, 89 percent of our goals completed the assessment cycle.

Finally, Georgia Tech is committed to improving institutional effectiveness through an aggressive training and employee advancement program. This year, the Office of Organizational Development (OOD) experienced a record enrollment of faculty and staff in a record number of offerings. Over 5,500 participants filled the seats in nearly 600 classes during FY 2007, representing an 18 percent increase in enrollment and courses offered. A total of 729 staff have completed one of the four professional certificate programs, with FY2007 seeing a record 169 graduates. Georgia Tech's commitment to providing customer service was assisted through the inaugural offering of the "Defining Customer Service" Certification Program. More than 180 employees signed up for the program and as of the end of the fiscal year, 34 staff members completed the program.

## **Section 2: Overall Institutional Health**

We believe the information provided in this report supports the assertion that Georgia Tech's overall institutional health is strong. We continue to monitor progress

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through benchmarking studies and market evaluations. All evidence suggests our positive momentum continues. Our national rankings reached their highest ever, both overall as well as from a disciplinary standpoint. All time highs were achieved for enrollments at the undergraduate and graduate levels, women's enrollment, research awards, and numbers of companies being served by our state business incubator. The quiet phase of our capital campaign continues to move along well, having cleared the mid-point of the \$1 billion goal on schedule.

Our market studies were capped by a national opinion survey of prospective students, parents, corporate executives, opinion makers, and university presidents and provosts. By comparing results from previous studies, it is apparent that Georgia Tech has improved in its standing in all of the groups surveyed and that there is a growing understanding of the expanded role of the Institute. The data also showed we have areas where improvement is needed. For example, the strength of our international programs is not well appreciated, and many do not understand the role of our increasingly popular "humanities with a technology twist."

One of the challenges we face going forward is a financial resources picture that is very tight. The lag in the formula has hit us hard as we have experienced significant growth in student enrollment without a commensurate increase in faculty. Class sizes have grown, as has student/faculty ratio. It has also proven difficult to support needs for matching research grants or find resources for events that arise unexpectedly as well as new initiatives. Finally, with the added operational cost of expensive facilities that will come on line next year like the new Marcus Nanotechnology Research Center Building, our budget will be strained. Overall, Georgia Tech is stretched thin and anecdotal information suggests that campus morale is suffering.

After years of building a high quality faculty, we also are seeing a brisk trade in offers being made to our faculty from other universities and entities. The number of

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counter offers we have had to make is in the range of 80 per year over the past two years. Our counter offers not only include salary enhancements, but also new laboratory equipment and space. With limited resources to apply in such cases, we have lost outstanding faculty to other institutions.

The coming year will be one in which Georgia Tech will continue to work with the Chancellor and the Board of Regents in his efforts to improve Georgia Tech and to assist the USG. On our own campuses, we will seek to build on pools of excellence in areas of importance to the state, including energy, nanotechnology, information technology, logistics, biotechnology, healthcare and transportation. We expect to continue to enhance our educational programs to address interdisciplinary growth areas and to develop the technological talent needed for the state's economic growth.

### **Section 3: Institutional Accomplishments**

Georgia Tech has been shaped by generations of students, faculty, staff and alumni who envisioned a better future and were innovative and entrepreneurial in their efforts to realize it. Their labors have built one of the nation's most prominent public universities, and their foresight has instilled in the Georgia Tech community a keen awareness of the growing leadership opportunities for a technological university in a world that increasingly turns to technology for solutions.

#### **Rankings**

- *U.S. News & World Report:* Georgia Tech was ranked seventh among the nation's public universities, the highest ever, and among the top 10 public universities for the ninth consecutive year. Both graduate and undergraduate engineering programs were ranked among the nation's top five, and the College of Management's MBA program moved into the top 10 among public universities. The Cooperative Education Program, internships, and undergraduate research program were highlighted as "programs to look for."

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- *Diverse: Issues in Higher Education* named Georgia Tech the nation's top producer of African American engineers.
- *Hispanic Business* magazine ranked Tech among the top engineering schools for Hispanic graduate students.
- *BusinessWeek* ranked the College of Management's undergraduate programs second in the nation for return on investment and included the College of Architecture on its list of the world's top 60 design schools.
- The Southern Growth Policies Board ranked Georgia Tech third in the nation in the number of nanotechnology researchers who are "highly cited" in peer-reviewed publications.
- A Milken Institute study identified Georgia Tech as one of the world's top universities in commercializing biotechnology discoveries and technologies.
- The Global Gaming League included Georgia Tech among the Top Ten Gaming Colleges in the United States based on superior programs, opportunities, and technologies for videogaming, which Tech faculty and students use as a medium to model and simulate complex societal problems.
- *The Scientist* magazine named Georgia Tech among the top 15 places to work in academia in the United States.
- The Association of College and Research Libraries awarded the 2007 Excellence in Academic Libraries Award to Georgia Tech.
- Georgia Tech was inducted into the Cooperative Education Hall of Honor.

**Student honors and accomplishments**

- Georgia Tech's new Honors Program admitted its first group of 120 freshmen living together and taking special honors sections of courses together. The program received high marks from both students and faculty.
- Finding Common Ground, a student-led initiative, encouraged small group student discussions around controversial issues to promote greater appreciation and respect for diversity, and featured a visit by poet Maya Angelou.

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- Goldwater Scholars: Biomedical engineering students Inn Inn Chen and Yixao Zou.
- *USA Today's* all-USA College Academic Team: Inn Inn Chen.
- Gates Cambridge Scholarship: Nabil Wilf, 2006 graduate and Fulbright Fellow to Kuwait
- Kauffman PhD Dissertation Fellowship: Management student Drew Hess.
- National Large Chapter of the Year Award: Georgia Tech Chapter of the National Society of Black Engineers.
- NCAA National Championship: Women's tennis team. Coach Bryan Shelton was named National Coach of the Year.
- Fifteenth appearance in the NCAA Basketball Tournament.
- ACC single-season softball records in team batting average, home runs, RBIs, total bases, slugging percentage, and runs scored.
- The rowing team won a gold and two silver medals at the Dad Vail Regatta, collegiate rowing's largest event.

**Faculty honors**

- Daniel Guggenheim Medal: Aerospace Engineering Chair Robert Loewy.
- Edison Medal: Chemical Engineering Professor Russell DuPuis.
- Association of Computing Machinery No. 1 software engineering scholar in the world: Computing Professor Mary Jean Harrold.
- American Association for the Advancement of Science Mentor Award: Electrical and computer Engineering Chair Gary May for in increasing underrepresented groups in science and engineering.
- Fulkerson Prize for discrete mathematics breakthroughs: Associate Professor of Computing Eric Vigoda.
- Fellows of the American Association for the Advancement of Science: Evans Harrell II, Mathematics; Boris Mizaikoff, Chemistry and Biochemistry; Nancy Nersessian, Computing and Z. L. Wang, Materials Science and Engineering.

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- National Science Foundation CAREER Awards: Kim Cobb, Earth and Atmospheric Sciences; Nicholas Feamster, Computing; Facundo Fernandez, Chemistry and Biochemistry; Charles Isbell, Computing; Subhash Khot, Computing; Seong-Hee Kim, Industrial and Systems Engineering; Hsien-Hsin Lee, Electrical and Computer Engineering; Gabriel Loh, Computing; Bruce Walker, Psychology; and Hao-Min Zhou, Mathematics. Georgia Tech continues to have the second highest number of CAREER award winners in the nation.
- National Association of College and University Business Officers' Distinguished Business Officer Award: Executive Vice President Robert K. Thompson.
- National Society of Black Engineers' Minority Engineering Program Director Award: Gordon Moore, director of the Office of Minority Education Development

**Research milestones**

- FY2007 sponsored research awards: \$374 million, more than double the amount of a decade ago.
- FY2007 research expenditures place Georgia Tech among the nation's top five institutions without a medical school.
- Technology transfer: 323 invention disclosures; an all-time high of 58 patents issued, 9 new companies formed:
  - Georgia Tech and IBM developed the world's fastest silicon chip with frequencies above 500 gigahertz.
  - The National Institutes of Health awarded Georgia Tech its third nanomedicine research center, this one focused on DNA and RNA repair. Emory University and the Medical College of Georgia are partners. Georgia Tech is the nation's only university with three nanomedicine centers.
  - Tech researchers developed individualized 3-D modeling and simulation techniques that enable pediatric cardiac surgeons to design and test customized heart-surgery procedures in advance of the actual surgery.

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- Scientists at Georgia Tech and Emory University developed a quick test for biomarkers such as viruses.
- Georgia Tech is a partner with Oak Ridge National Laboratory and the University of Georgia in a \$125 million bioenergy research center funded by the U.S. Department of Energy.
- A \$12 million research partnership between Tech and Chevron will pursue cellulosic biofuels and hydrogen fuels for transportation.
- Tech researchers built and successfully flew an unmanned aircraft with a twenty-two-foot wingspan that is powered by hydrogen
- Georgia Tech is one of seven research universities in IBM's Open Collaborative Research program, which will develop open source software code and publish related intellectual property openly and royalty free.

**Outreach activities**

- President Wayne Clough was asked by the White House to serve as the United States' senior representative at the Business and University Leaders Symposium on Innovation, held in Moscow in conjunction with the G-8 Summit. He also served as a member of the National Governors Association Task Force on Innovation.
- *E-Liberia: Vision 2010*, a new national information and communication technologies policy developed with the assistance of Georgia Tech was unveiled by Liberia President Ellen Johnson-Sirleaf, who visited campus in Sept. 2006.
- French Minister of Foreign Trade Christine Lagarde visited Georgia Tech to discuss collaborative economic development projects between Georgia Tech and Lorraine, and between Georgia and France.
- Ireland President Mary McAleese visited campus in April, and Georgia Tech facilitated a trade mission to Ireland by Governor Sonny Perdue.

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- The Center for Assistive Technology and Environmental Access created ATWiki—an online encyclopedia of assistive technology for persons with disabilities.
- Companies in incubation at Tech’s Advanced Technology Development Center accounted for ten of the state’s top 25 venture capital deals, including the two largest.

**Facilities**

Opened:

- Christopher W. Klaus Advanced Computing Building
- Molecular Science and Engineering Building
- Library East Commons, offering space for group projects and study groups as well as the Jazzman’s Café.
- Ferris-Goldsmith Trading Floor, a 2,000-square-foot high-tech model trading floor to prepare students for careers in investment banking and financial services.
- Fifth Street Bridge, a park-like link over the expressway to Technology Square.
- North Avenue Apartments (former Georgia State dorms), enabling 70 percent of undergraduates to be housed on campus.

Under construction:

- Marcus Nanotechnology Building, the largest cleanroom facility in the Southeast and the first in the nation designed for biomedical research.
- Old Civil Engineering Building (renovation)

***Progress in Institutional Strategic Planning***

Georgia Tech’s Strategic Plan, which will be updated during the coming academic year, dovetails nicely with the new University System of Georgia Strategic Plan:

- The first goal in both plans focuses on students’ education needs.

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The USG's action items address restructuring of the core curriculum; increasing the six-year graduation rate to exceed the national average by 2015; ensuring high quality academic advisement as well as global knowledge; and rewarding faculty members who make meaningful contributions to undergraduate learning and success. With a first-year retention rate at a solid 92 percent and our six-year graduation rate at 78 percent, Georgia Tech already exceeds the national average and aspires to meet or exceed the average retention and graduation rates of our peers. To do so, we have improved academic advising, establishing the Georgia Tech Academic Advising Network and hiring professional advisors to support students about professional education (i.e, Pre-medicine, Pre-law, and Pre-secondary education). Our International Plan and robust study abroad programs are uniquely positioned to assist the global education goals of the System. A third of our undergraduates have some type of international experience by the time they graduate. We require all faculty to be engaged with undergraduates, and our award-winning Center for the Enhancement of Teaching and Learning focuses on helping our faculty improve. We signed an innovative MOU with South Georgia College and will extend this type of collaborative agreement to other USG institutions over time.

- As one of the system's fastest growing institutions, Georgia Tech supports the System's goal of increasing its enrollment capacity by 100,000.

In 2004, Georgia Tech set a long-range enrollment goal of 25,400 students by 2020, and has been moving toward this goal. Georgia Tech has typically accounted for seven percent of the System enrollment, and achieving our own enrollment goal would add the 7,000 additional students the System's Strategic Plan would envision for us. We also are focused on creating a diverse community, and now have a student population that is 38 percent minority (12 percent underrepresented minority), 28 percent female, and 18 percent international. We are pursuing delivering more degrees via distance learning, and expanding programs in Atlanta and Savannah that are collaborative with other university system units. We plan a graduate/undergraduate split of 70/30 among the 7,000 additional

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students to enable the strategic growth of our graduate programs while accommodating those undergraduates who are seeking degrees from Georgia Tech.

- Georgia Tech is one of the nation's leading research universities, is widely recognized as a leader in commercializing its research, and aspires to be a truly global university, which support the System's third strategic goal.

Georgia Tech ranks 31<sup>st</sup> among all research universities in research and development expenditures and fifth among institutions with a medical school – highest of any unit in the USG. Federal research expenditures typically account for 58 percent of Georgia Tech's research activity. Georgia Tech has pursued industry research partnerships, which comprise more than 20 percent of our total R&D compared to a national average is only percent. Our partnership with Emory University in a joint biomedical engineering department and research institute has enabled us to triple our research funding from the Department of Health and Human Services' National Institutes of Health.

Our local, regional and global economic development efforts serve the USG's goal of supporting the economic development needs of Georgia. Distance-based learning will continue to play an important role in the future delivery of academic programs, particularly at the master's degree level, and we are closing in on our goal of increasing our professional and distance education offerings by 50 percent. We continue our efforts to provide an effective, "one-stop" organizational structure that supports the commercialization of discoveries made by our faculty and students. This year, the Office of Research and Support was reorganized into the Office of Research and Innovation to better guide the investment of Institute research and innovation resources.

- Georgia Tech already works closely with Georgia's K-12 education system, as encouraged in the USG's fourth goal.

Georgia Tech has a vested interest in the USG's ability to strengthen teacher quality, recruitment and retention as a strong PK-12 system is critical to the success of Georgia Tech's own students and to our ability to attract girls and underrepresented

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minorities to science, engineering and technology. The metrics chosen to measure the USG's STEM (science, technology, engineering, mathematics) initiatives speak directly to Georgia Tech's strengths in engineering, computing and science. Georgia Tech already has numerous programs that reach out to K-12 schools in metro Atlanta and around the state, and during the next update of our strategic plan, we will explore the ideas put forth in the USG plan to work with the state's other education agencies.

- Georgia Tech Promise is a new need-based student assistance program that directly supports the USG's fifth goal of maintaining affordability.

The Georgia Tech Promise program combines grants, work/study, and need-based assistance from Tech to enable undergraduates from Georgia with family income of less than \$30,000 to graduate without relying in student loans. It is the first of its kind in the System. The USG also addresses development and fundraising within this goal, which is another area in which Georgia Tech has achieved success. The endowment held by Georgia Tech and its foundations has grown to \$1.6 billion, and our \$1 billion Capital Campaign is set to move into its public phase at the end of the fiscal year. Our next strategic planning exercise will address the stewardship of the funds entrusted to us by the donors in this campaign. We are prepared to share our expertise as part of the System's review of "Best Practices."

- The System's Strategic Plan calls for increasing efficiency and Georgia Tech continuously seeks a supportive, collaborative, effective administrative structure.

Georgia Tech is committed to delivering the highest quality services, facilities, and equipment for our community. Our strategies include investment in the professional development of our staff (see page 4). Following a careful study, the human resources function at Georgia Tech was restructured to enhance its effectiveness in driving the attraction, retention, and performance of the Georgia Tech workforce and providing more streamlined services to the campus. Georgia Tech also seeks to develop a sustainable campus by building environmentally friendly facilities and conserving energy and water

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in its operations. A campus stewardship office has been established to coordinate these efforts, and the update of our strategic plan will more fully address the issue of energy conservation.

Georgia Tech estimates that we have completed 80 percent of the goals set five years ago in our most recent Strategic Plan, and we are now preparing to update the plan. The release of the USG's Strategic Plan is timely, because it will enable us to ensure that our own goals align with and support those of the System.