

RETURN ON INVESTMENT
FISCAL YEAR 2006

A REPORT FROM PRESIDENT G. WAYNE CLOUGH TO THE GEORGIA TECH FOUNDATION

DEFINING THE FUTURE

RESEARCH WITH RELEVANCE
STUDENT SUCCESS IN ATHLETICS, RESEARCH
LEARNING WITH A GLOBAL PERSPECTIVE
A REVOLUTION IN HUMAN HEALTH
UNRESTRICTED FUNDS ROUND-UP



Georgia Institute
of Technology



DR. JOHN McDONALD, CHAIR OF THE SCHOOL OF BIOLOGY AND CO-DIRECTOR OF THE OVARIAN CANCER INSTITUTE, PREPARES TUMOR SAMPLES FOR STUDY.

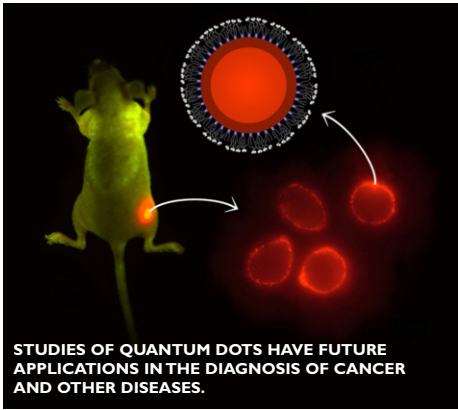
DEFINING THE FUTURE

When most people think about what makes Georgia Tech distinctive, cancer research is probably not one of the first things that comes to mind. At least not yet.

Last year the National Cancer Institute announced the designation of seven National Centers of Cancer Nanotechnology Excellence, and listed among that group of renowned medical schools at prestigious universities was none other than Georgia Tech. The Institute’s partnership with Emory University in a joint cancer nanotechnology research center is illustrative of how Tech is reshaping what it means to be a top-tier research university in the twenty-first century.

In addition to continued renown in core areas such as logistics, manufacturing, materials, aerospace engineering, and transportation, Georgia Tech has used its genuinely interdisciplinary environment to build new strengths in biotechnology, nanotechnology, photonics, bioinformatics, high-performance computing, technology policy, and systems biology. This ability to be flexible and leverage its strengths has allowed the Institute to take on bold new challenges such as making breakthroughs in treatments for cancer and other deadly diseases, developing renewable energy sources while helping reduce energy consumption, creating the next generation of computer chips, and understanding the nature of the growth in intensity of hurricanes.

For many years, the Georgia Tech Foundation has embraced the Institute’s spirit of flexibility and collaboration, supporting a diverse array of projects with funding from private gifts. That tradition continued in fiscal year 2006, with Foundation funds supporting a broad spectrum of projects including undergraduate research, international programs, alternative fuels research, student-athletes, and countless others. We hope the projects featured in the pages of this report will clearly illustrate the vital role that Georgia Tech Foundation funds play in moving the Institute toward its goal of defining the future—a future where technology is utilized to save lives and solve problems on a scale never before imagined.



STUDIES OF QUANTUM DOTS HAVE FUTURE APPLICATIONS IN THE DIAGNOSIS OF CANCER AND OTHER DISEASES.

Summary of Use and Source of Georgia Tech Foundation Funds
by Program, FY2006
(\$ in thousands)

PROGRAM/FUNCTION	RESTRICTED ENDOWMENT INCOME	RESTRICTED GIFTS & GRANTS	UNRESTRICTED ALLOCATIONS	TOTAL
Academic Programs	\$10,661	\$13,582	\$2,901	\$27,144
General Institutional	179	1,127	1,163	2,469
Development	16	342	3,761	4,119
Facilities	-	24,802	3,654	28,456
Scholarships and Fellowships	4,902	2,202	4,588	11,692
Total	\$15,758	\$42,055	\$16,067	\$73,880

Summary of Use and Source of Georgia Tech Foundation Funds
by Major Unit, FY2006
(\$ in thousands)

	RESTRICTED ENDOWMENT INCOME	RESTRICTED GIFTS & GRANTS	UNRESTRICTED ALLOCATIONS	TOTAL
Academic Support				
Architecture	\$218	\$581	\$95	\$894
Computing	230	1,730	97	2,057
Engineering	6,787	7,210	804	14,802
Ivan Allen	492	694	211	1,397
Management	593	483	202	1,278
Sciences	759	1,382	458	2,599
Academic Centers	1,545	1,896	106	3,548
GTRI	96	163	-	259
Subtotal	\$10,721	\$14,140	\$1,972	\$26,833
Student Financial Aid Office	4,099	1,371	4,700	10,170
Development Office	16	342	3,761	4,119
Student Life*	36	1,256	341	1,633
Institute Support**	887	1,089	1,678	3,654
Facilities	-	23,857	3,615	27,471
Total	\$15,758	\$42,055	\$16,067	\$73,880

* Includes Student Affairs and Auxiliary Services/Arts
** Includes offices of the President, Provost, Senior Vice President for Administration and Finance, and Institute Communications and Public Affairs



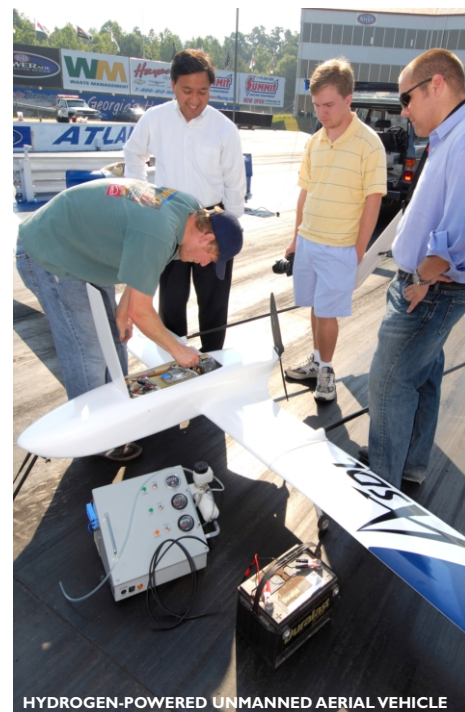
RESEARCH WITH RELEVANCE

The Georgia Tech Foundation has long been committed to supporting the Institute's mission of pursuing a research agenda that improves human life and helps sustain the environment. That commitment was demonstrated in FY 2006 by funding that supported Tech's Strategic Energy Initiative and that helped bring one of the world's most prominent systems biologists and his research team to campus.

The Foundation provided crucial seed funding for the Strategic Energy Initiative (SEI), whose mission is to facilitate Georgia Tech's rise to national leadership in the development of energy technologies. Areas of focus include transportation technologies, building energy systems, central electric power, and manufacturing processes.

Early support from the Foundation is already bearing fruit. Last summer, Chevron Corp. and Georgia Tech formed a strategic research alliance to pursue advanced technology aimed at making cellulosic biofuels and hydrogen viable transportation fuels. Chevron Technology Ventures, a subsidiary of Chevron, plans to collaborate with SEI and contribute up to \$12 million over five years for research into and development of these emerging energy technologies.

The focus of the joint research is to develop commercially viable processes for the production of transportation fuels from renewable resources such as forest and agricultural waste. This is viewed as an important advancement over



HYDROGEN-POWERED UNMANNED AERIAL VEHICLE



DR. JEFFREY SKOLNICK EXPLAINS THE ROLE OF SUPER-COMPUTING IN HIS SYSTEMS BIOLOGY RESEARCH.

first-generation biofuels such as ethanol and biodiesel, which are made from agricultural crops such as corn, sugarcane, and soybeans.

"This research alliance underscores Chevron's commitment to expand and diversify the world's energy sources and represents an ambitious effort to achieve breakthrough technology in the development of cellulosic biofuels," said Don Paul, Chevron vice president and chief technology officer.

As the United States approaches an energy tipping point due to oil and gas production constraints, SEI will provide national energy options and opportunities by developing energy technology strategies with the goal of a more independent, secure, and environmentally sound economy.

Another critical effort supported by Foundation funding was the effort to bring acclaimed systems biologist Jeffrey Skolnick and his research team to Georgia Tech. Skolnick joined the faculty last spring as the Georgia Research Alliance Eminent Scholar in Computational Systems Biology.

Systems biology is the integration of mathematics, physics, chemistry, and biology with advanced, high-performance computing and engineering and is focused on exploiting the vast information growing out of the sequencing

of the human genome. For example, as a systems biologist, Skolnick brings a different scientific approach to creating new drugs. Utilizing bioinformatics and systems biology, his method reduces the number of compounds drug developers must screen by a factor of ten, creating cost savings and shortening the time to market.

Supporting Skolnick's work is the IBM Razor, one of the world's most powerful supercomputing clusters.

"Georgia Tech and its School of Biology are doing some incredible work in cancer research," said Skolnick. "The Institute has built a collaborative environment for meaningful interdisciplinary research especially in the areas of science, computing, and engineering. The environment cuts across schools and research centers and offers opportunities to take new ideas, scientific breakthroughs, and business application ideas from theory to practice."

"Dr. Skolnick is an entrepreneurial scholar whose research is critical to the future health of Georgians and Americans," said C. Michael Cassidy, president of the Georgia Research Alliance. "He has relationships with pharmaceutical and technology companies, holds three patents, has developed and licensed software to biotech

companies, and has founded an early stage structural proteomics company. This is the mix of entrepreneurialism and scholarly acumen we seek in our scholars."

Skolnick's work received support from the Tom and Marie Patton Leadership Fund, which has helped recruit and retain a number of prominent faculty since it was established in 1999.



GEORGIA TECH'S KRISTI MILLER COMPETED IN THE 2005 U.S. OPEN

STUDENT SUCCESS IN ATHLETICS, RESEARCH

Securing funding for the maximum number of scholarships allowed by the NCAA is a high priority for the Georgia Tech Athletic Association, and the Georgia Tech Foundation will be a key partner in reaching that goal. The beneficiaries of this effort will be student-athletes like Kristi Miller, a Georgia Tech tennis standout who competed in the 2005 U.S. Open.

"The first time I walked into the player's lounge, there were players eating, and Andre Agassi was at the next table," she recalled. "I looked down at the practice court, and Serena and Venus were out there hitting. I was sitting there in shock, and for me to not talk, it has to be pretty cool."

After setting the school record for both singles and doubles victories, Miller's summer schedule concluded with the U.S. Open following an unexpected call from Megan Bradley, who had just finished her career at the University of Miami. Miller and Bradley teamed to advance to the doubles quarterfinals of the USTA Bronx Challenger. Shortly afterwards, Bradley called Miller to ask if she would play alongside her in the U.S. Open.

"Since I was little, I've always loved watching the U.S. Open," Miller said. "I went with my family two years ago, and I loved every minute of it. So to be able to go and be a player was just amazing. You just don't get the opportunity to do that, especially while you're in college."



BIOLOGY MAJOR STEVEN BLACKWOOD IS CONSIDERING A CAREER IN SPORTS MEDICINE

Steven Blackwood is another Yellow Jacket who has experienced some dramatic moments in the heat of competition. Over a six at-bat stretch on consecutive nights, the outfielder hit three home runs, two of which tied Georgia and Duke in the late innings. And that's not even the most pressure-packed challenge he's faced. That distinction goes to a microbial physiology exam during finals week.

"That was the toughest final of my college career so far," said Blackwood, a senior biology major. "It was ten questions for four hours, and the professor gave us a stack of paper at least twenty pages thick. The questions themselves took about thirty minutes to read. It was pretty much applying all the course's concepts."

Head Baseball Coach Danny Hall recognized Blackwood's dedication

to his studies early on. "If we have practice at 3:15, most of the guys might be here at 2:00 maybe playing cards, watching TV, or hitting a little extra," Hall said. "Blackwood is usually buried in a book. He's the consummate student-athlete and deserves all the honors he's gotten."

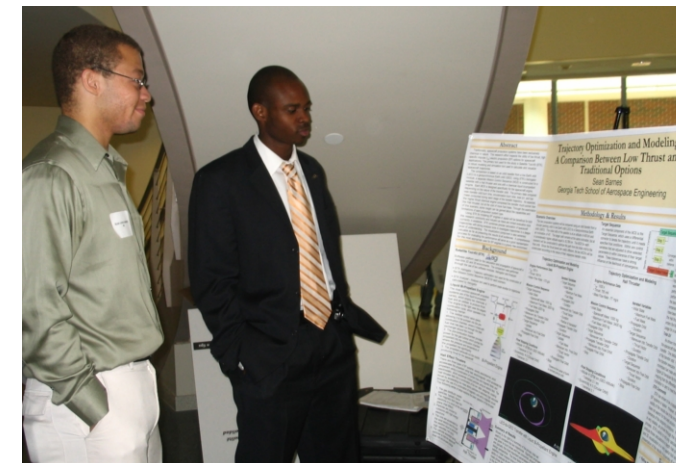
Blackwood is hoping to follow in the footsteps of his older brother Wes, who played baseball at the University of Georgia and then went on to medical school. Wes is now a pediatric cardiologist, while Steven is leaning towards sports medicine.

For biology majors like Blackwood whose future plans include medical school, participating in undergraduate research is becoming more and more common, and Georgia Tech is working to make that experience readily available, relevant, and engaging.

In an effort to raise awareness among undergraduates about available research options, the Undergraduate Research Opportunities Program (UROP) sponsored the first Institute-wide Undergraduate Research Poster Session last spring. Fifty-one students prepared and presented posters outlining their research. Forty faculty and graduate student judges evaluated posters for presentation and appearance, research content, and ability to present to a multidisciplinary audience. Awards for the top posters in each college were given at the event.

"Providing opportunities for Georgia Tech undergraduate students to present their work in interdisciplinary forums of their peers and the university faculty is important not only in providing opportunities for undergraduate students to perfect their presentation skills, but also in exposing other students to research in the many disciplines across campus," said Karen Harwell, director of UROP. "We are very grateful to the Georgia Tech Foundation for their support of this event and of many other elements of the undergraduate research program."

Last spring's Undergraduate Research Poster Session gave students the opportunity to prepare and present posters outlining their research.





The opportunity to study abroad is invaluable for any student, and the Georgia Tech Foundation helps make that experience possible for President's Scholars by augmenting support provided by the Fleet International Scholarships. In 2005-06, more than forty-five President's Scholars utilized the Fleet Scholarship for study abroad. One of those students was Rachel Benkeser, an international affairs major who participated in the Business and Politics in Argentina and Brazil program.

"Being in Argentina and Brazil brought my studies to life," said Benkeser. "It's one thing to study about the political situations in a country and another thing entirely to meet with government officials and talk with people in the streets. While I have pursued Latin American studies on campus, my experience of being in South America helped me understand the nuances and subtleties of a region I otherwise would never have even guessed at."

Benkeser described her time in South America as a 24/7 learning experience. "As a tourist or even an esteemed visitor to another country, you don't receive the same insight that you do when you engage in intense academic study for half a day and then continue your academic study in observations and every endeavor you undertake," she said.

Studying abroad, especially in a country with an unfamiliar language, inspired feelings of both confidence and humility in Benkeser. "I now have the confidence that I can care for myself, fend for myself (as is literally necessary in some countries), and express my beliefs and opinions while keeping an open mind," she said.



"The humility I have gained comes from being an outsider to a community and trying to work my way in, and from recognizing and identifying communities in which people with very little have so much to teach one another and to teach me. Even if I don't work in a foreign country or even work with immigrants after graduation, I will carry with me this confidence and this humility."

Studying abroad is an integral element of Tech's new International Plan, which launched in the fall of 2005 and enables students to add an international dimension to their major. Participants take courses in modern languages, global economics, and international affairs, and spend two terms abroad studying or working in a co-op assignment or internship.

"I think we've come up with the national standard," said Associate Provost for Institutional Development Jack Lohmann. "As I travel and give talks and presentations on what we're doing, it is very clear that no one else is doing anything like this. I think it is going to position Georgia Tech competitively."

The International Plan dovetails with new interdisciplinary degree programs begun last fall by the Ivan Allen College of Liberal Arts. Two of the degrees combine modern languages with either global economics

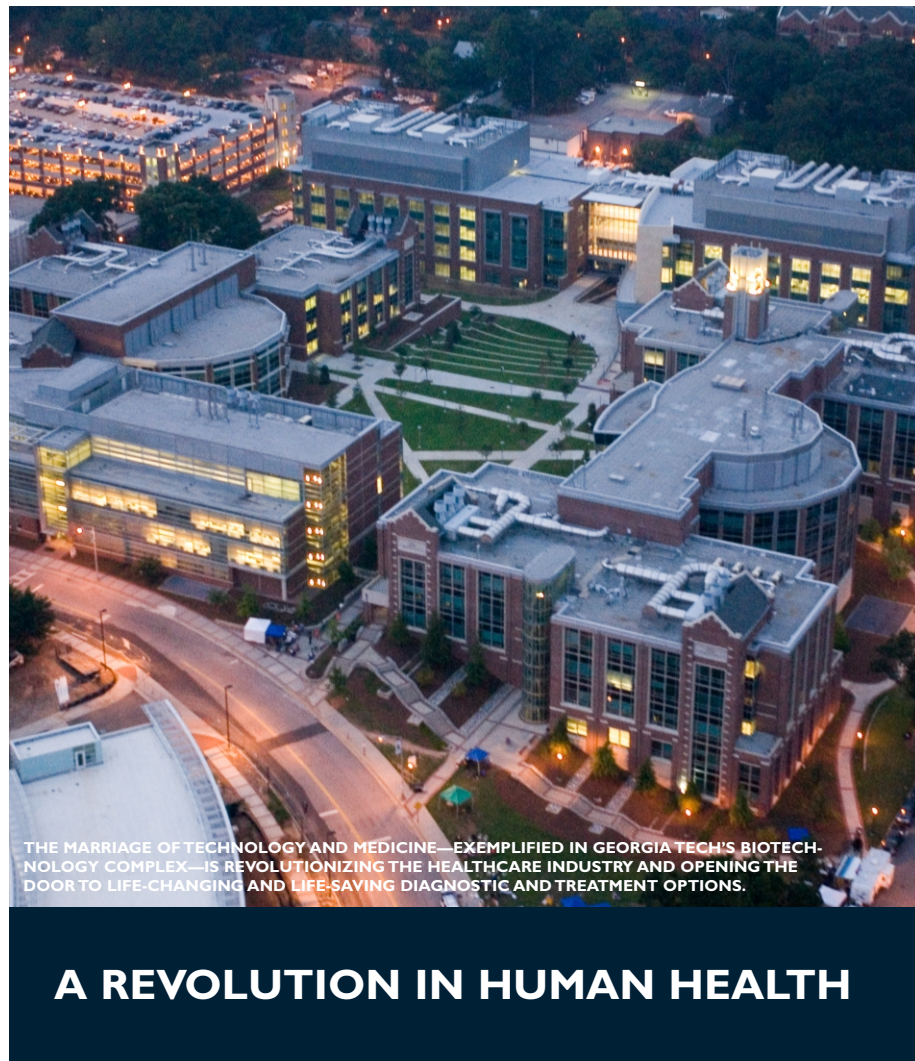
or international affairs. A third offers a joint degree in economics and international affairs (EIA), providing students more of the policy analysis and strategic planning skills in economics and international affairs that employers look for.

"When you study international affairs, your level of analysis is usually the nation state, and you really can't conceive of the nation state as a political entity without understanding the role that economics plays," said Andrew Miles, a student

who changed his major from international affairs to the EIA program. "I took three economics courses before I knew this new major existed. The practical side of me felt that adding economics to my degree would make me more marketable in the private sector."

Associate Professor Xiaoling Li teaches a Chinese class, part of the Modern Languages curriculum in the Ivan Allen College of Liberal Arts.



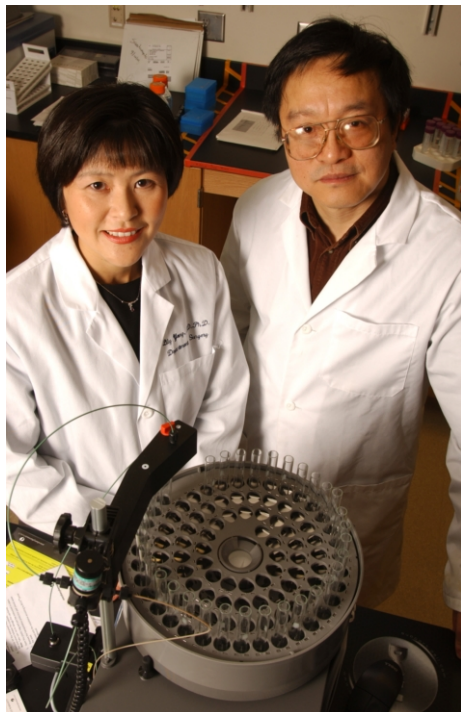


Georgia Tech's rise to prominence in the promising fields of nanotechnology and nanomedicine has been almost meteoric, thanks in part to support from the Georgia Tech Foundation.

Nanotechnology research is vital to the future of the region and the nation because it will produce materials ten times stronger than steel but much lighter in weight, digital storage units the size of sugar cubes that can hold all the information in the Library of Congress, and tiny medical devices that can detect individual cancer cells and target them with specialized treatment.

While Georgia Tech is a recognized leader in nanotechnology, the Institute is also developing a prestigious reputation in the subdiscipline of nanomedicine. In Fall 2006, the National Institutes of Health (NIH) awarded Georgia Tech and research partners Emory University and Medical College of Georgia (MCG) a grant to partner on a Nanomedicine Development Center that will focus on DNA damage repair. With up to \$10 million in funding, the Center will be Georgia Tech and Emory's third NIH-funded nanomedicine/nanotechnology center in less than two years.

The Center, to be based at Georgia Tech in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, is headed by Gang Bao, College of Engineering Distinguished Professor in the Department of Biomedical Engineering, who will serve as director. The Center will receive between \$6 million and \$10 million from the NIH over the next five years, and almost \$3 million from the Georgia



Research to develop molecular beacons technology for the early detection of pancreatic cancer is supported by the Wallace H. Coulter Foundation.



Research Alliance, a public-private partnership of Georgia universities, businesses, and government created to build the state's technology industry.

"Georgia Tech is leveraging our strengths in nanotechnology and biomedical engineering to lead the way in the emerging field of nanomedicine, which has tremendous potential to make the practice of medicine more preventive and less invasive," said Georgia Tech President Wayne Clough. "This is the third nanomedicine/nanotechnology center that the NIH has awarded to Georgia Tech and Emory University, and we are very pleased to have the Medical College of Georgia join us as a partner in this one. Together we are helping Georgia to emerge as a top state for nanomedicine."

Providing critical support to Georgia Tech's nanomedicine initiative is legendary businessman and philanthropist Bernie Marcus, who has been a household name in Atlanta and Georgia for a number of years. His name joined the ranks of Tech tradition last summer when ground was broken for the facility that bears his family's name.

In recognition of a \$15-million commitment to the building's construction from The Marcus Foundation, the facility is slated to be named the Marcus Nanotechnology Building,

pending Board of Regents approval.

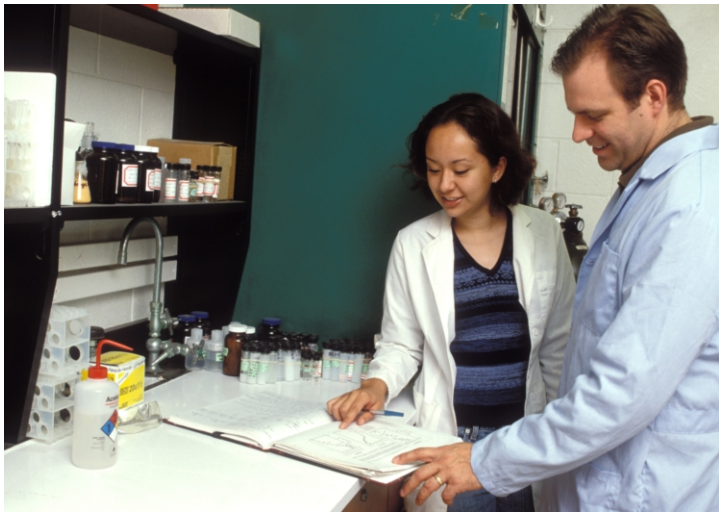
"It is hard for people to understand what can come out of the nanotechnology world, but we do understand the benefits it can produce for medicine," said Marcus, retired chairman of The Home Depot and founder and chairman of The Marcus Foundation. "The combination of Georgia Tech working with other universities in this state doing nanotechnology research will give us great potential in solving terrible diseases."

"This facility isn't going to be exclusive. It is going to be available to scientists throughout our University

System and in the private sector as well," said Governor Sonny Perdue. "The role of government is to help facilitate a place where good ideas can come together and generate new ideas. This facility promotes innovating for the sake of a better quality of life for our citizens."

In addition to The Marcus Foundation commitment, The Woodruff Foundation made a commitment of \$5 million for the project last year. Completion of the Marcus Nanotechnology Building is scheduled for summer 2008.

Professor L. Andrew Lyon (right) has developed a material that may one day allow patients to forgo injections and pills and receive medications through micro-thin implantable films that release medication according to changes in temperature.



UNRESTRICTED FUNDS ROUND-UP

COLLEGE OF ARCHITECTURE

The Music Technology Group at Georgia Tech is pushing the boundaries of musical expression and creativity through technology, and Foundation funding is helping to make that happen.

Gil Weinberg, director of Music Technology in the College of Architecture's Music Department, received Foundation support for the development of a computerized, interactive musical system for collaboration and improvisation dubbed "iltur." The system allows amateurs and professional jazz musicians to collaborate using novel musical controllers called Beatbugs. New software was developed for the system, which analyzes audio in real time and allows Beatbug players to trigger and modify the recorded audio, creating call-and-response routines with professional players on the fly. In addition, iltur was invited, juried, and performed in multiple concerts, nationally and internationally, where it received critical acclaim.

"I believe that iltur has great potential for developing high-visibility concerts that will create substantive ties between the Music Department's new technological emphasis and its traditional service-oriented activities," said Weinberg. "It can facilitate collaborations not only among the participating performers, but also between faculty and students in programs such as industrial design and music, enabling participants to combine their technological and artistic interests."

To further encourage the development of innovations like iltur, the College of Architecture has launched a new Master of Science in Music Technology, the first Georgia Tech degree to combine art with technology.

COLLEGE OF COMPUTING

As the pool of prospective students grows increasingly diverse, both in the United States and abroad, the College of Computing has intensified its efforts to recruit and retain significant numbers of women and minority students. In a discipline that has been dominated by men for decades, this is a tall order.

Thanks to funding from the College of Computing Dean's Chair—supported by the Georgia Tech Foundation—the College has been able to establish and maintain a strong recruitment and retention program targeted to women and minority students. A key element of these efforts is the Women@CC group, a tightly knit community of female graduate and undergraduate students who meet socially, share meals, and mentor one another. The group also encompasses women faculty, prospective students, and alumnae.

Similar opportunities are provided for minority Computing students via the Minorities in Computer Science (MiCS) group, whose mission is "to build and perpetuate a strong minority computer science community that promotes academic excellence, professional success, adept leadership, and technological awareness amongst minority youth."

Augmenting the Dean's Chair funding is a recent commitment of \$255,000 from San Diego-based Science Applications International Corp. (SAIC) to establish the GT/SAIC Scholars Program. The program matches women and minority undergraduates and master's students with PhD student mentors and their faculty advisors. Active engagement in a research project throughout the academic year is also included in the experience.

"Diversity in our student body has been a significant focus for several years. We have been successful not only in maintaining enrollment of under-represented groups, but also increasing our numbers at a time when other computing schools are experiencing the opposite," said Richard A. DeMillo, dean and John P. Imlay Jr. Chair of the College of Computing. "More work remains to be done, of course, but the generous support of the Georgia Tech Foundation, SAIC, and many others has helped us make tremendous progress in attracting and retaining a highly qualified and diverse student body."

COLLEGE OF ENGINEERING

Improving the operational efficiency of the nation's strained healthcare system and transforming the way healthcare is being delivered is the mission of Georgia Tech's recently established Health Systems Institute, an interdisciplinary initiative of the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University. Nowhere is that mission more crucial than the specific arena of medical care provided to children.

Thanks to a \$1.7-million commitment from Children's Healthcare of Atlanta and supplementary funding from the Georgia Tech Foundation, the Center for Pediatric Outcomes & Quality (CPOQ) has been established as a unit within the Health Systems Institute. CPOQ will combine clinical and health services research and quality and systems initiatives to improve the quality and efficiency of pediatric healthcare.

From the Georgia Tech side, CPOQ will apply the latest technologies and methods from biomedical engineering, computer science, industrial engineering, management, and other disciplines to solve problems associated with delivering quality care to children. Through Children's Healthcare, CPOQ can address problems spanning the entire life cycle of patient care via its access to clinical and operational resources in both the inpatient and outpatient care environments.

In recent years, both the medical industry and the public have recognized the inefficiencies and error rates in the healthcare system are unacceptable, resulting in an increasingly unified call to improve the quality and effectiveness of patient care.

"This is especially important for pediatric hospitals as children are more susceptible to bad outcomes when medical errors occur and children's hospitals are 'safety net' care providers that bear a heavier burden of uncompensated care," said François Sainfort, founder and director of the Health Systems Institute and William W. George Professor of Health Systems in the Department of Biomedical Engineering. "Thus, pediatric healthcare providers are faced with the challenge of simultaneously reducing costs and improving care quality."

IVAN ALLEN COLLEGE OF LIBERAL ARTS

Professor Doug Noonan in the School of Public Policy has developed a "Formal Models of Public Policy" course that trains students to model empirical settings in order to derive critical insights for designing and improving public policy. The doctoral-level course, developed in part through Georgia Tech Foundation funding, emphasizes modeling social phenomena to inform the design and evaluation of public policy.

The goals of the course are to teach students a wide variety of standard formal models for policy analysis, give them practice in applying them to real-world policy situations, and help them develop a formal model for a policy problem of their own choosing.

"The first half of the course emphasizes the purpose and practice of formal modeling in the social sciences," said Noonan. "We introduce students to dozens of formal models popular in the social sciences and policy analysis. In the second half of the course, students gain practice fitting these models to empirical situations and drawing conclusions."

The course utilizes a suite of in-class demonstrations of formal models, online competitions, and a computer modeling assignment that gives students a chance to devise their own formal model and test it in a rich computerized environment.

"This elective course is intended to be useful for doctoral policy students in all policy areas," said Noonan. "Science and technology, environmental, economic development, telecommunications, and urban policy areas have all benefited from formal modeling efforts, and we have designed this course to be broadly useful."

COLLEGE OF MANAGEMENT

The unique experience of working in a trading floor environment while still in school is a competitive advantage enjoyed mostly by students at Ivy League universities planning careers in investment banking and financial services.

That same competitive advantage is now available to Georgia Tech's Management students. On November 24, the College of Management dedicated its

new Ferris-Goldsmith Trading Floor, a facility made possible by generous gifts from Joyce Ferris, widow of Dakin B. Ferris Jr., Class of 1950 and retired vice chairman of Merrill Lynch, and Barbara and Jere W. Goldsmith IV, IM 1956, semi-retired first vice president of investments at Merrill Lynch and former chairman of the Georgia Tech Foundation's Development Committee. The Ferris and Goldsmith gifts were augmented by Georgia Tech Foundation funds.

The 2,000-square-foot trading floor, located on the fourth floor of the Management Building, helps introduce Management students at all levels to a financial trading floor environment and train them in the use of financial analysis and electronic trading tools and methods. The training prepares students to pursue careers in investment banking or financial services.

In addition to being an invaluable learning vehicle for students, the trading floor will serve as an important research arena for Management faculty in the areas of improved human performance in trading environments and the creation of new financial analysis models. The trading floor will also house the new Quantitative and Computational Finance Program, an interdisciplinary master's degree program ranked twelfth in the nation and led by faculty in the School of Mathematics, the Stewart School of Industrial and Systems Engineering, and the College of Management.

"Attracting students who are interested in brokerage and investment banking careers, and engaging our alumni who are already actively working in those fields, will result in graduates who are better prepared for Wall Street-type careers, as well as those related to issues of energy strategy and its financing," said Steve Salbu, dean of the College of Management and Stephen P. Zelnak Jr. Chair. "We are tremendously grateful to Mrs. Ferris, Mr. and Mrs. Goldsmith, and the Georgia Tech Foundation for their support. The Ferris-Goldsmith Trading Floor will go a long way toward truly differentiating our business school from the competition."

COLLEGE OF SCIENCES

Marine ecosystem processes, including chemical signaling occurring among many species, directly and indirectly affect global climate, human health, and the sustainable use of environmental resources. Yet, the understanding of chemical signaling is patchy, especially in marine environments.

To improve this understanding, Julia Kubanek, associate professor of chemistry and biochemistry, and her colleague Nael McCarty, associate professor of biology, have utilized funding from their Blanchard fellowship to develop a chemoreception research project. Specifically, Blanchard funds are currently supporting the stipend and research expenses of Staci Padove, a PhD student in biology who is using molecular cloning, electrophysiology, and analytical chemistry approaches to identify taste receptors in fish.

"These taste receptors within the mouth parts of certain fish species allow them to recognize toxins and distasteful compounds present in some foods, specifically marine sponges, which some fish will eat, but others won't," explained Kubanek. "The sponge toxins and distasteful compounds serve as chemical defenses to the sponges. When the fish bites into the marine sponge, it immediately spits out the food because of the bad taste of the sponge compounds. But not all fish can taste the same bad-tasting compounds; some fish have evolved specialized taste receptors (chemoreceptors) for this purpose."

Kubanek said that while the project is ongoing, it has already yielded valuable data. In addition to making headway into understanding the signal-transduction pathway that is triggered when the sponge's chemical defenses make contact with fish mouthparts, Kubanek said the research team is also exploring the development of natural products from aquatic organisms for their pharmaceutical potential.

"There are high expectations for future drug development from chemical compounds isolated from marine organisms, including seaweeds, sponges, and marine microbes," she said.

