

The **POWER** of **STRATEGIC** **PARTNERSHIPS**

2012 ANNUAL REPORT



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THE POWER OF STRATEGIC PARTNERSHIPS

Georgia Tech's students, faculty, staff, and alumni have always taken great pride in their legendary work ethic and strong determination to see a project through to successful conclusion. While they have the talent and grit to achieve a great deal individually, they also know that collaborating with others can produce even more powerful outcomes, such as gaining insights into real-world problems, garnering support for experiential learning, and securing accelerated pathways for the application of research results.

Forming and nurturing strategic partnerships and alliances is more important than ever for ensuring the success of our mission and our strategic plan. Perhaps the most vivid expression of our commitment to collaborating with valued partners is the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, a unique joint venture between a public and a private university that has dramatically advanced the diagnosis and treatment of a broad range of medical conditions since its founding fifteen years ago.

Our collaborative efforts in the medical arena continue today as we partner with Children's Healthcare of Atlanta on a \$20 million joint investment that will create innovative technological solutions to substantially improve the health of children across the country and around the globe. Our longstanding affiliation with the Georgia Research Alliance has played a vital role in this partnership, recruiting dozens of leading teacher-scholars who are dramatically advancing the frontiers of knowledge.

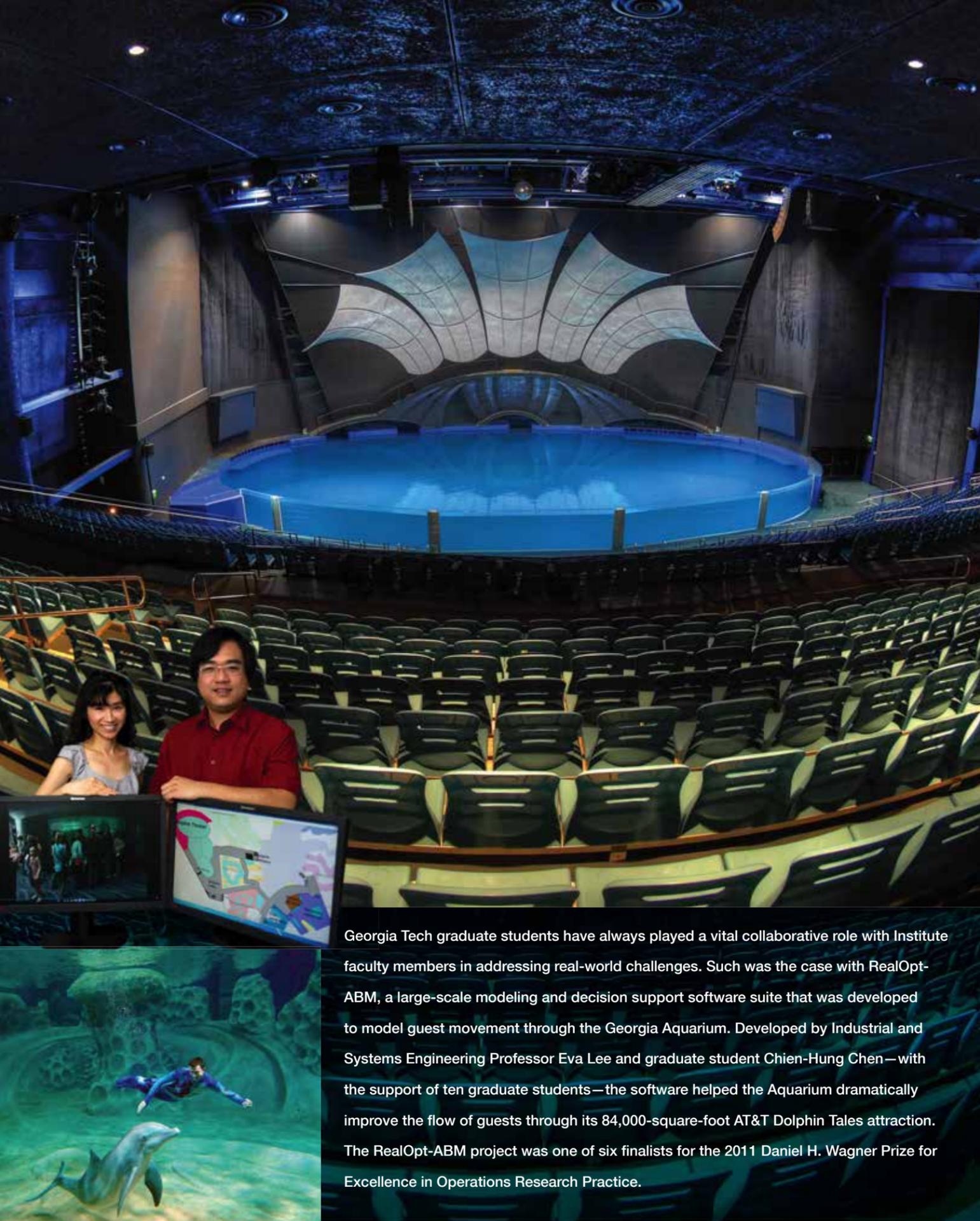
Beyond the context of healthcare, Georgia Tech is engaged in numerous robust alliances with governmental agencies at the federal, state, and local levels; industry and corporate partners; the U.S. military; community service organizations; and a host of educational institutions from K-12 schools to other universities. These long-term, vastly productive relationships have made our nation's infrastructure more efficient and secure, helped countless businesses keep pace with technological advancements and remain competitive in a global marketplace, improved educational outcomes for students from kindergarten through graduate school, and provided vital assistance to some of our society's most vulnerable citizens.

I want to thank all of those organizations and individuals who have collaborated with Georgia Tech and our people over the decades; your perspectives and your contributions have and continue to be invaluable. I also invite you to explore the pages of this Annual Report and discover more about the power of Georgia Tech's numerous and varied strategic partnerships.

Sincerely,

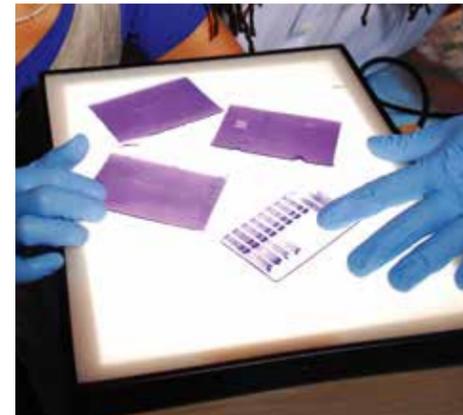
G. P. "Bud" Peterson, President





Georgia Tech graduate students have always played a vital collaborative role with Institute faculty members in addressing real-world challenges. Such was the case with RealOpt-ABM, a large-scale modeling and decision support software suite that was developed to model guest movement through the Georgia Aquarium. Developed by Industrial and Systems Engineering Professor Eva Lee and graduate student Chien-Hung Chen—with the support of ten graduate students—the software helped the Aquarium dramatically improve the flow of guests through its 84,000-square-foot AT&T Dolphin Tales attraction. The RealOpt-ABM project was one of six finalists for the 2011 Daniel H. Wagner Prize for Excellence in Operations Research Practice.

HONORING AND SUPPORTING OUR STUDENTS



Georgia Tech students possess not only a drive to succeed professionally, but also a passion to use their knowledge and expertise to make the world a better place. Our students are noted for their collaborations with each other, their communities, and students around the globe, and this work has consistent and genuine impact. The Institute strives not only to honor their achievements, but also to provide the best programming and resources to support our students' endeavors.

Awards and Honors

In an effort to fight cardiovascular disease, a team of biomedical engineering students devised an electrocardiograph, a device used to detect and diagnose heart abnormalities, from e-waste components. The team acquired smart phones through donation programs, using the cell phone hardware for processing and transmission, while other components were used for signal input and isolation.

The team placed first in the International E-Waste Design Competition's "E-Waste Reuse category" for their project, dubbed CardioReach.

Although technologies that detect and treat cardiovascular diseases exist, they are not available in many developing countries, which is why the Georgia Tech team took on the project. The team is working on making CardioReach less expensive but still more competitive than

other similar devices in use in Brazil, Russia, China, and India.

Fighting cancer is the focus of one of two students who this year received Goldwater Scholarships, the premier academic award given to mathematics, science, and engineering undergraduates.

As a freshman, biomedical engineering major Binbin Chen began working "shoulder-to-shoulder" with Assistant Professor Manu Platt on a cancer project. "Both of my grandfathers died of cancer, so I always hoped to contribute on the battlefield of cancer research," Chen said.

Also receiving a Goldwater Scholarship was computer science major Ramya Ramakrishnan, who plans to carry on research in the field of human-computer interaction. Venkat Goli, a chemical and biomolecular engineering major, received an honorable mention. Goldwater



“Stay With It” encourages students to complete their undergraduate engineering degrees.

Scholarships cover the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 per year.

In addition to his studies in chemical and biomolecular engineering, undergraduate Onaje LaMont spends a great deal of time on community service projects such as conducting leadership workshops, mentoring peers, fundraising for cancer survivors, participating in literacy programs, and raising money to support scholarships.

LaMont was honored for his efforts last fall with the \$10,000 Pearson Prize for Higher Education, which recognizes students who have distinguished themselves through academic excellence in pursuit of an undergraduate degree while also serving the community.

Seven high-achieving engineering students were named to the inaugural class of NASA Space Technology Research Fellows: Chris Coen from electrical and computer engineering and Nicole Bauer, Matthew Bopp, Cole Kazemba, Demyan Lantukh, Mihir Pathak, and Zach Putnam from aerospace engineering.

The students received graduate fellowships from NASA to pursue master’s or

doctoral degrees in relevant space technology disciplines at Tech. The Space Technology Fellows will perform innovative space technology research while building the skills necessary to become future technological leaders. The awards include a stipend that ranges from \$30,000 to \$36,000.

Augmenting prestigious awards received by individual students are a total of seven awards garnered by Tech’s Interfraternity Council (IFC) for its work in scholarship and service. These included the Academic Achievement and Scholarship Programming Award, credited to the work of scholarship chairs from each chapter throughout the year.

“By the end of 2011, every chapter on campus had a scholarship plan in place versus the two-thirds that did at the start of the year,” said Mason Elledge, IFC vice president of communications.

Other awards for IFC include Educational Programming, Outstanding Education Program, Campus and Community Relations, Community Service, Outstanding Philanthropy, and an honorable mention for Risk Management and Judicial Procedures.

Activities and Programming

As the societal need for highly skilled engineers increases, technological universities across the country are faced with the challenge of undergraduate engineering students dropping out of their programs of study before graduating. To combat this problem, the White House launched its “Stay With It” campaign last year on the Georgia Tech campus to encourage undergraduate engineering students to stay with their field of study and graduate with an engineering degree.

Launched by the President’s Council on Jobs and Competitiveness, “Stay With It” is the first student outreach campaign focused on connecting engineering students to a community of their peers and experienced engineers, role models, and influencers to encourage them to stay with their field of study through graduation.

Nationally, only 14 percent of all U.S. undergraduate students are enrolled in science, technology, engineering, and mathematics (STEM) programs, and there is a 40 percent attrition rate for those enrolled in these disciplines after the first year. Georgia Tech, however, is the gold standard for the retention and graduation of students in these fields—94 percent freshman retention, 80 percent six-year graduation rate—which is why the Institute was selected to host the campaign launch.

“We are changing the way engineers learn with new approaches to the undergraduate curriculum,” said College of Engineering Dean Gary May, a Georgia Tech alumnus. “Rather than focus on traditional means to deliver content, we give students complex, multifaceted, and realistic problems to help them develop effective

problem-solving skills and participate in self-directed learning. The professor becomes more of a facilitator supporting the student’s learning process.”

Education Delivery

For traditional universities to thrive in times of ever-accelerating change, they must develop new approaches to content delivery that have been tested with real students and validated in the marketplace. Georgia Tech is committed to leading the initiatives that define new educational technologies, and the Center for 21st Century Universities (C21U) is Georgia Tech’s living laboratory for fundamental change in higher education. Launched in September 2011, C21U focuses on technology-driven innovation, balancing optimal student outcomes and creative institutional change. By combining technology solutions with practice and process changes, C21U leverages beneficial industry and educational connections.

In July 2012, C21U led the development of Georgia Tech’s strategic partnership with Coursera to offer massive online courses (MOOCs) as a member of the company’s second cohort of prestigious universities.

“It seems clear that higher education is currently experiencing the first ripples of a wave that could drastically alter the method, scope, and scale of educational access and delivery,” said Provost Rafael L. Bras. “Georgia Tech has been in the business of offering online courses and education for some time. By joining Coursera we seek to expand our presence in that space, provide increased global access to our excellent educational products, experiment with new methods and ideas in the delivery of education and, most importantly, enhance the learning options and convenience for our own students.”



Yellow Jackets cap impressive year with three ACC championships

The previous year saw the continuation of Georgia Tech’s legendary tradition of combining prestigious academics with high-caliber athletics.

The Yellow Jackets captured three ACC championships—golf, softball, and baseball. Five Tech teams participated in NCAA postseason play—women’s basketball, golf, women’s tennis, softball, and baseball.

Three of the women’s teams enjoyed exceptionally good years. The women’s basketball program enjoyed its best season ever, advancing to the ACC Tournament title game and to the NCAA Sweet 16. Softball continued its path as the ACC’s most dominant program by winning the conference championship and playing in the NCAA Tournament for the eleventh time. Softball standout Kelsi Weseman was named ACC Player of the Year for the second consecutive season. Women’s tennis spent the spring ranked in the national polls and earned another NCAA postseason bid.

As for the men, the football team exceeded all expectations by winning eight games, knocking off sixth-ranked and eventual ACC champion Clemson along the way, and participating in a bowl game for the fifteenth consecutive year. The baseball team overcame numerous injuries and became the first No. 8 seed to win the ACC Tournament crown, earning an automatic bid to the NCAA Tournament. Baseball coach Danny Hall won his 1,000th career game. The golf team, playing in one of the nation’s top golf conferences, won its fourth consecutive conference championship. Coach Bruce Heppler was named ACC Coach of the Year.

Academically, Georgia Tech’s Academic Progress Report improved for the fifth consecutive year. ■

Clough Commons dedicated to students' academic success

Back in 1996, approaching his second anniversary on campus, President Emeritus G. Wayne Clough came to a pivotal conclusion. In order for Georgia Tech to become the globally preeminent research and educational institution it aspired to be, the Institute's undergraduates needed a state-of-the-art facility staffed by professionals specifically and intensively focused on the students' early academic success.

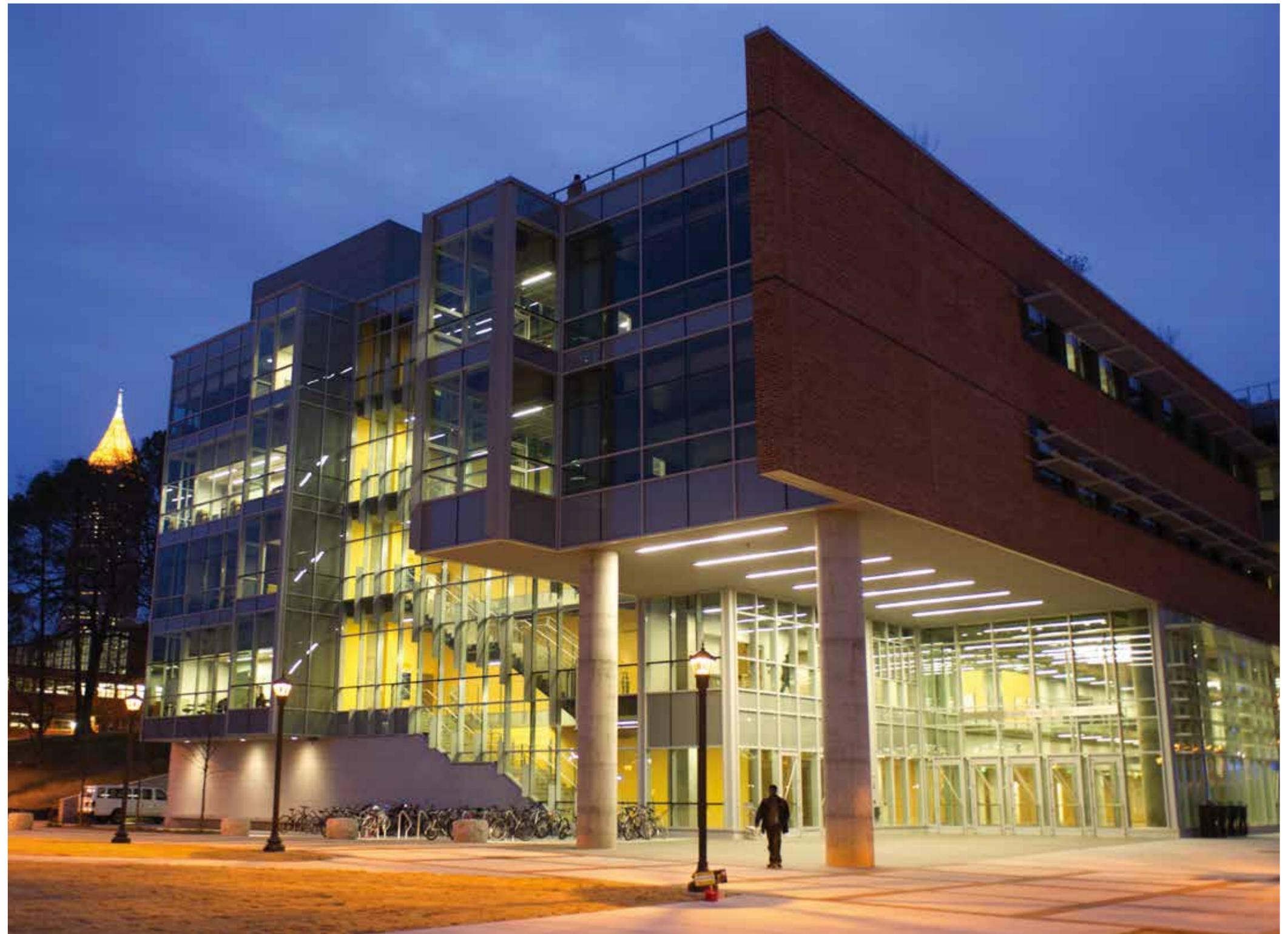
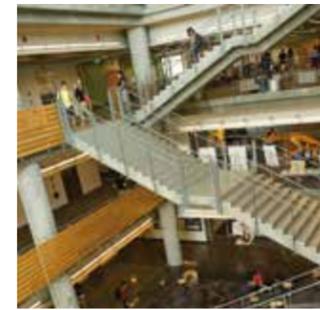
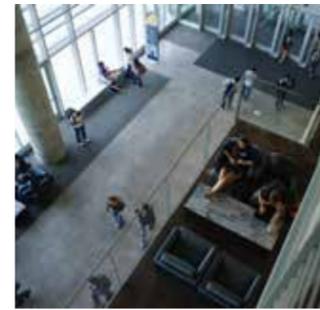
Clough's leadership team quickly embraced the vision, and preliminary planning began for what was referred to in those early days as the Innovative Learning Resource Center. A full fifteen years later, the G. Wayne Clough Undergraduate Learning Commons was dedicated on September 24, 2011, Clough's seventieth birthday.

"The journey that brings us to this day is measured in years," said Clough, who ended his fourteen-year presidency in 2008 to become secretary of The Smithsonian Institution. "It began fifteen years ago with a simple idea: that Georgia Tech students, who are among the nation's best and brightest, deserve no less than the best educational experience Georgia Tech can provide them so they can take their place as leaders in the twenty-first century. This simple idea has led us to a profound and happy outcome. When I was president of Georgia Tech, I often cited a quote by the great architect Daniel Burnham: 'Make no little plans, for they have no magic to stir men's souls.' This building has that magic and will allow this university to live up to its obligation to its talented students."

Alumnus Alfred P. West Jr., who chaired Campaign Georgia Tech during its quiet phase, reflected on the importance of the Commons' open architecture.

"You can see the effect open architecture has on the spirit of those who enter," said West. "Future generations of Georgia Tech students will be the beneficiaries, learning in collaboration, in groups, and at all hours. Wayne, I believe this building suits you well. It is a tangible expression of your commitment to the student experience."

"Thank you, Dr. Clough, for making undergraduate education a priority at Georgia Tech," said Elle Creel, then-president of the undergraduate Student Government Association. "This building is truly the legacy of your impact at Georgia Tech." ■



USING OUR RESEARCH FOR THE COMMON GOOD

Perhaps in no other facet of Georgia Tech's mission is the power of partnerships more dramatically expressed than in the arena of research. Our longstanding and extensive collaborations with industry, government, healthcare, educational, and community institutions have yielded significant advancements in medicine, environmental sustainability, national security, and a host of other disciplines. The power of our strategic research alliances translates into healthier and safer lives for people throughout the world.

Health/Biomedicine

If good health is the foundation for a healthy life, then nothing can be more important for the future of our country and our world than the health of our children. That's why Georgia Tech and Children's Healthcare of Atlanta have inaugurated a \$20 million joint investment focusing on technological solutions to improve children's health.

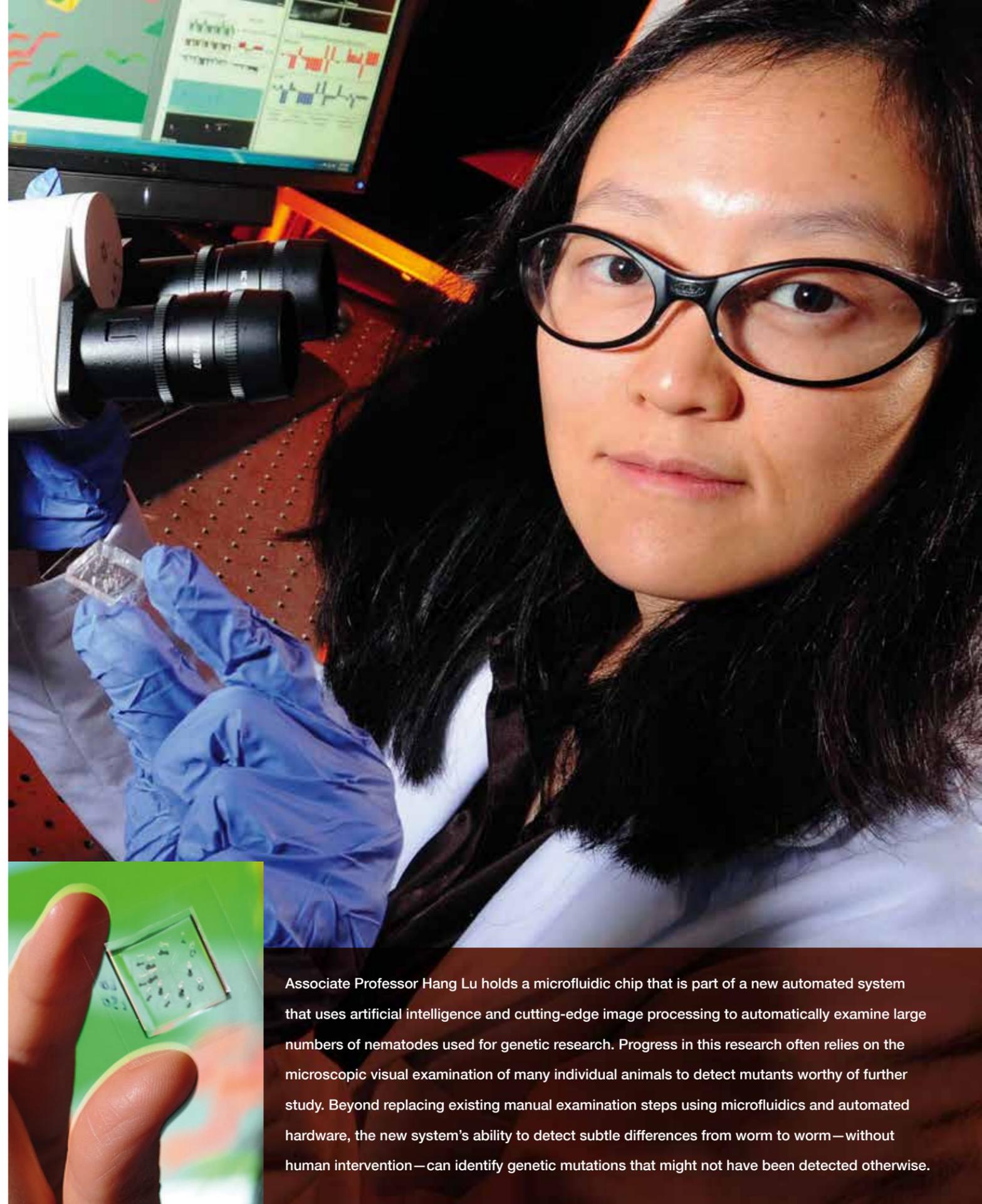
The expanded collaboration combines the proficiencies of both organizations with a common vision—to become the global leader in pediatric technologies.

"What brings us together is changing the lives of the kids. The children of Georgia and throughout the country deserve the best care we can provide," said Children's President and CEO Donna Hyland. "At Children's, our mission is to make kids better today and healthier tomorrow. We can do so much more with

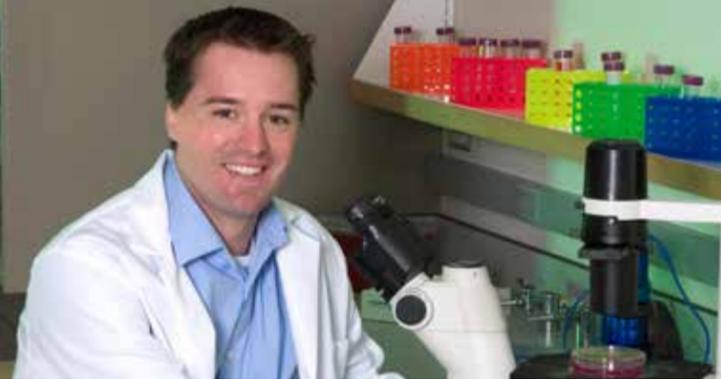
a strong partnership with Georgia Tech. Our \$20 million alliance makes it clear just how committed both parties are to helping kids and provides an extraordinary opportunity for others who care about kids to join us."

"This initiative also builds on our existing partnerships with other medical education leaders in the state and represents another example of how we are strategically fostering alliances that will help improve the human condition," said President G. P. "Bud" Peterson. "This collaboration will not only improve the lives of children, but also create new technologies that will lead to new products, new companies, and more jobs for Georgia."

The enhanced alliance will support current researchers and recruit new researchers who will conduct



Associate Professor Hang Lu holds a microfluidic chip that is part of a new automated system that uses artificial intelligence and cutting-edge image processing to automatically examine large numbers of nematodes used for genetic research. Progress in this research often relies on the microscopic visual examination of many individual animals to detect mutants worthy of further study. Beyond replacing existing manual examination steps using microfluidics and automated hardware, the new system's ability to detect subtle differences from worm to worm—without human intervention—can identify genetic mutations that might not have been detected otherwise.



Professor Todd McDevitt (left) is leading efforts to use embryonic stem cells for better tissue regeneration in wound sites.



Microneedle technology astly improves treatment of diseases such as age-related macular degeneration.

fundamental and translational research. Georgia Tech researchers will work in close collaboration with Children's clinicians to develop the best possible technologies for advancing children's health and delivering pediatric services in leading-edge research areas from nanomedicine and regenerative medicine to innovative approaches for healthcare delivery.

The alliance has been initiated by a \$10 million investment from Children's, which will be matched by planned investment from Georgia Tech, culminating in a \$20 million commitment to research focusing on pediatric technology and fundamental and translational research.

In another vital partnership, the National Institutes of Health (NIH) awarded nearly \$2 million to researchers at Georgia Tech and Emory University to develop a new class of therapeutics for treating traumatic injuries and degenerative diseases. The five-year project focuses on developing biomaterials capable of capturing certain molecules and delivering them to wound sites to enhance tissue regeneration in adults. By applying these unique molecules, clinicians may be able to harness the regenerative power of stem cells while avoiding concerns of tumor formation and immune system compatibility associated with most stem cell transplantation approaches.

"Pre-clinical and clinical evidence strongly suggests that the biomolecules produced by stem cells significantly impact tissue regeneration independent of differentiation into functionally competent cells," said Todd McDevitt, director of the Stem Cell Engineering Center at Georgia Tech and an associate professor of biomedical engineering. "We want to find out if the signaling molecules

responsible for scarless wound healing and functional tissue restoration during early stages of embryological development can be used with adult wounds to produce successful tissue regeneration without scar formation."

The grant includes plans for engineering biomaterials that can efficiently capture morphogens, which are molecules secreted by embryonic stem cells undergoing differentiation. The study will also evaluate the regenerative activity of molecule-filled biomaterials in animal models of dermal wound healing, hind limb ischemia, and bone fractures. Examining the effects of the morphogens on a range of animal wound models will increase the likelihood of success and define any limitations of the technology, such as its use for specific tissues or injuries.

Another joint Georgia Tech/Emory effort has yielded technology for delivering drugs and other therapeutics to specific locations in the eye, and this technology has provided the foundation for a startup company that has received a \$4 million venture capital investment.

The Atlanta-based startup, Clearside Biomedical, plans to develop microinjection technology that will use hollow microneedles to precisely target therapeutics within the eye. If the technique proves successful in clinical trials and wins regulatory approval, it could provide an improved method for treating diseases that affect the back of the eye, including age-related macular degeneration.

The technology was developed in collaboration between the research groups of Mark Prausnitz, a Regents' Professor in chemical and biomolecular engineering, and Henry Edelhauser, an Emory ophthalmology professor. Research

leading to development of the technology was sponsored by the NIH.

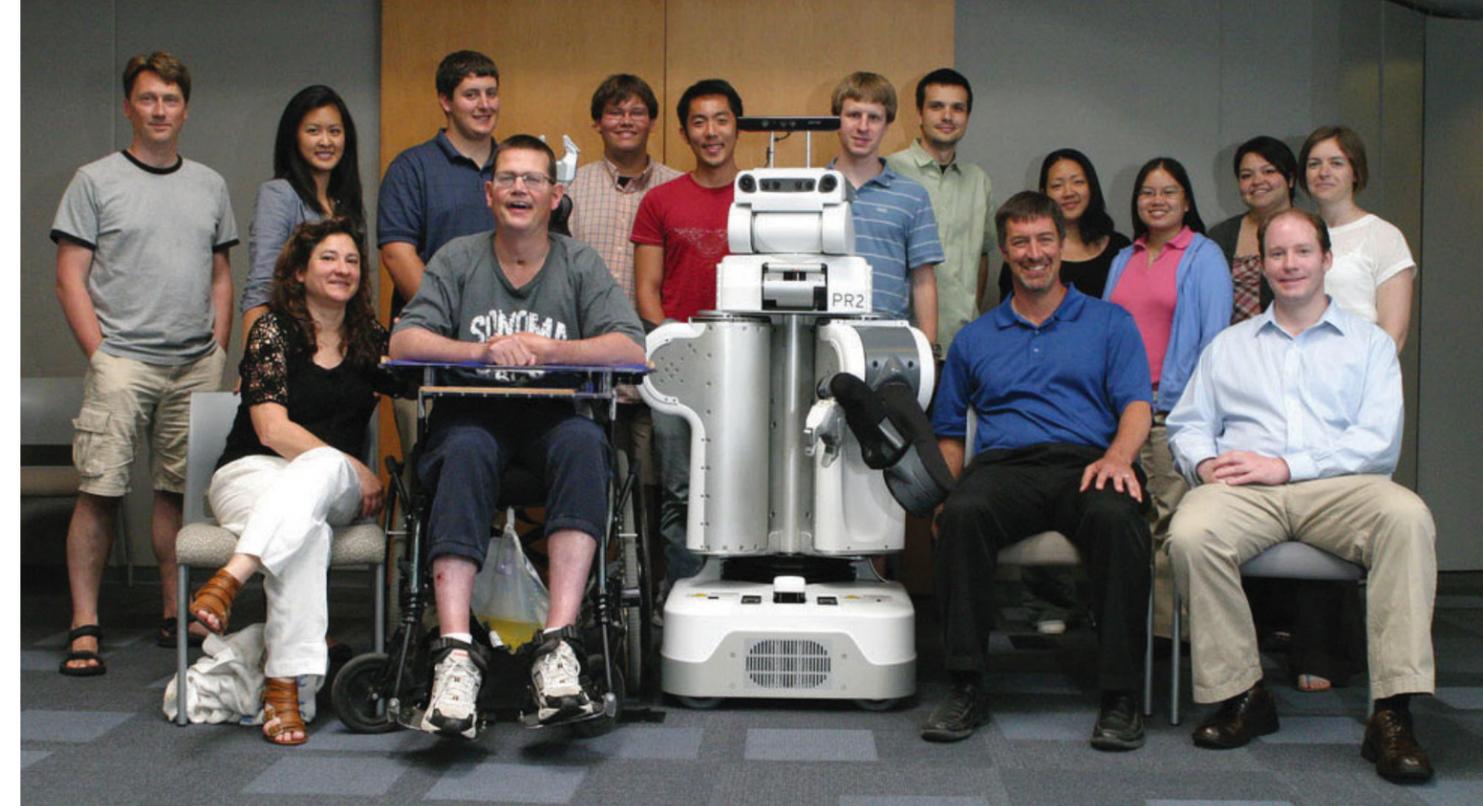
"We expect that targeting drug delivery within the eye will be helpful because we should be able to concentrate drugs at the disease sites where they need to act, and keep them away from other locations," said Prausnitz. "This could reduce side effects and possibly also decrease the dose required."

Wireless Technology and Robotics

Using technological innovation to improve the lives of people with disabilities is the focus of two ongoing projects.

In one project, this important goal is being furthered by a \$4.75 million, five-year grant from the U.S. Department of Education to Georgia Tech and Atlanta's Shepherd Center. The grant—awarded for research and development of wireless technologies aimed at enhancing the lives of people with disabilities—supports the continuation of a decade of innovative research and engineering at the Wireless Rehabilitation Engineering Research Center (RERC), a collaboration between Shepherd Center and Georgia Tech.

"This funding will allow us to move into new and emerging areas and leverage our relationships with the wireless industry, disability organizations, governmental agencies, and other researchers and engineers to promote equitable access to wireless technologies and to develop new assistive technologies built on wireless platforms," said Helena Mitchell, executive director of the Center for Advanced Communications Policy (CACP) in the School of Public Policy and principal investigator and co-director of the



The Robots for Humanity team helped a quadriplegic man regain some basic movements.

Wireless RERC grant. "This award affirms the growing importance of wireless technologies for those who have disabilities."

The award is the third consecutive five-year grant received by this team of researchers and engineers.

"The rapid pace at which wireless technology has evolved over the past several years—a pace that is expected to accelerate in the future—requires ongoing effort to ensure that the accessibility needs of people with disabilities are incorporated into new technologies," said Mike Jones, director of Shepherd's Crawford Research Institute and co-director for the Wireless RERC grant.

In technology development, the Wireless RERC will launch a new incubator to develop software applications ("apps"); the Apps Factory will fund innovative internal and external ideas on a competitive basis to provide apps to people with disabilities across a wide range of platforms. This work will enhance accessibility to this critical wireless technology and build new assistive tools based on these "smart" wireless platforms. Additionally, the Wireless RERC will continue its work developing solutions to enhance

the effectiveness and accessibility of emergency alerting and access to 9-1-1 emergency services.

The Wireless RERC will also continue its focus on consumer and public policy research, including wireless use and usability by consumers with disabilities and studies that may shape the development of public policy primarily related to general accessibility and emergency communications.

Georgia Tech participants in the Wireless RERC also include the Center for Assistive Technology and Environmental Access, College of Computing, Interactive Media Technology Center, School of Public Policy, and the School of Psychology.

In a second initiative focused on those with disabilities, the College of Computing's Robots for Humanity project is helping a quadriplegic man with basic movements via the aid of a Personal Robot 2 (PR2).

Since his stroke ten years ago, Henry Evans has been unable to scratch an itch or shave his face. But now, even though he is mute and quadriplegic, he can scratch himself and shave his cheek with the aid of a PR2 in a laboratory setting. The initial

steps show great potential for the role of personal robots in assisting individuals with disabilities.

"This is just the beginning," said Charlie Kemp, director of the Healthcare Robotics Lab at Georgia Tech and assistant professor of biomedical engineering. "We hope to really push on these technologies so robots like this can actually help people every day."

The Robots for Humanity project—a collaboration of Georgia Tech, Willow Garage, and Henry and Jane Evans of Palo Alto, California—started somewhat serendipitously. Last year, Henry Evans saw Kemp on CNN demonstrating his research with the PR2, a robot built by private research lab Willow Garage. Evans was excited about the robot's potential to help him, so he contacted Willow Garage and Kemp to see if they would be willing to work with him.

After crafting various interfaces, tools, and control software to help Evans perform more tasks on his own, Kemp and members from his research team flew to California to work with Willow Garage researchers and Henry and Jane Evans. At this meeting, Evans controlled the robot



The goal of VehicleForge is to create an online environment that will allow multiple design teams to work together to develop new military vehicles. GTRI researchers Nick Bollweg (left) and Jack Zentner are working to implement VehicleForge.

to scratch his face for the first time in ten years. Researchers also were able to learn more about Evans and his needs.

After years of physical therapy, Evans can move a finger and his head, which allows him to use computers. In addition to bringing the team together, Evans has been instrumental in the design and execution of the research, Kemp said.

Developing young computing researchers to ultimately assume roles like Kemp's is critically important. A \$1 million National Science Foundation (NSF) grant for the Ivan Allen College of Liberal Arts' EarSketch project aims to accomplish this task by transforming how students learn computer science in American high schools.

EarSketch is designed to encourage Atlanta's African American high school students to study computer science. The program allows students to remix hip hop music by writing computer code. EarSketch is based on Georgia Tech research that shows the relationship between gaming and an eventual interest in computer science is not as strong as may have been previously assumed, especially for minorities.

"Traditional approaches to teaching computer science are dismal in engaging non-white male students, and the numbers for African American males are relatively low compared to other ethnic groups," said Brian Magerko, assistant professor of digital media in the School of Literature, Media, and Communication. Magerko, the principal investigator on the project, is working with co-investigator Jason Freeman, in the College of Architecture's School of Music.

"We believe that by leveraging the collaborative nature of remix composition and

musically oriented computer programming, EarSketch may provide a successful alternative to the cultural issues that computer games have in the engagement of minorities," said Magerko.

EarSketch will teach students how to use a digital audio workstation and to control musical loops and beats by writing small bits of programming code. The project involves collaboration with Mike Reilly from Lanier High School, where the software and curriculum will be piloted in 2014.

National Security

More than a decade after 9/11, national security continues to be one of the highest priorities of the federal government, and Georgia Tech continues to play a vital role in helping to address this priority.

For example, the Georgia Tech Research Institute (GTRI) received a \$1.5 million contract to produce an online environment that will allow multiple design teams to work together to develop new military vehicles. The VehicleForge project's goal is to create a secure central website and other web-based tools and methods that would facilitate such collaborative development. The work is sponsored by the Tactical Technology Office of the Defense Advanced Research Projects Agency (DARPA).

"The aim here is to fundamentally change the way in which complex systems are taken from concept to reality," said Jack Zentner, a senior research engineer who is leading the project for GTRI with research scientist Nick Bollweg. "By enabling many designers in varied locations to work together in a distributed manner, we're confident that vehicles—

and eventually other systems—can be developed with greater speed and better results."

The core website, to be called vehicleforge.mil, would enable individuals and teams to share data, models, tools, and ideas to speed and improve the design process. As part of supporting designer collaboration, the VehicleForge approach would allow participants to reuse the models, tools, and other elements present on the site.

In a separate project, the U.S. Air Force Office of Scientific Research (AFOSR) awarded \$8.5 million to a consortium of seven U.S. universities that are working together to determine the best approach for generating quantum memories based on interaction between light and matter. The team will consider three different approaches for creating entangled quantum memories that could facilitate the long-distance transmission of secure information. The five-year Multidisciplinary University Research Initiative (MURI) is being led by Georgia Tech.

"We want to develop a set of novel and powerful approaches to quantum networking," said Physics Professor Alex Kuzmich, MURI's principal investigator. "The three basic capabilities will be storing quantum information for longer periods of time (on the order of seconds), converting the information to light, and transmitting the information over long distances. We aim to create large-scale systems that use entanglement for quantum communication and potentially also quantum computing." ■

Advanced Manufacturing Partnership supports American competitiveness

Henrik Christensen, a professor in the College of Computing, is leading the National Robotics Initiative, part of President Obama's Advanced Manufacturing Partnership.



When President Barack Obama was establishing the Advanced Manufacturing Partnership (AMP) steering committee, one of the first places he looked to was Georgia Tech. Obama appointed Georgia Tech President G. P. "Bud" Peterson to the initiative's steering committee, which will guide the efforts of industry leaders, federal agency heads, and university presidents, and will partner universities with industry and government agencies to develop new research and education agendas related to advanced manufacturing.

The overarching goal of AMP is to help U.S. manufacturers improve cost, quality, and speed of production in order to remain globally competitive. AMP will bring together industry, universities, and the federal government to identify and invest in key emerging technologies such as information technology, biotechnology, and nanotechnology.

"We applaud this initiative, and Georgia Tech is honored to collaborate to identify ways to strengthen the manufacturing sector to help create jobs in Georgia and across the United States," said Peterson, who also serves as a member of the Secretary of Commerce's National Advisory Council on Innovation and Entrepreneurship.

Obama also announced a new National Robotics Initiative as part of the advanced manufacturing and technology focus. Henrik Christensen, KUKA Chair of Robotics at Georgia Tech, serves as an academic and research leader on the National Robotics Initiative. According to Christensen, this is a critical time for the U.S. While the last twenty-five years saw tremendous progress due to the Internet, the next game-changing revolution will be robotics.

"Robotics technology addresses a number of our nation's most critical needs, including reinvigorating the United States

manufacturing base, protecting our citizens and soldiers, caring for our aging population, preserving our environment, and reducing our dependence on foreign oil," Christensen said. "Through the National Robotics Initiative, the United States can regain our leadership position from Europe, Japan, and South Korea, both in terms of basic research and in terms of the application of the technology to secure future growth. As home to one of the nation's top robotics programs, Georgia Tech is an enthusiastic member of this strategic effort."

"Many of our challenges can be solved through innovation and fostering an entrepreneurial environment, as well as collaboration between industry, education, and government to create a healthy economic environment and an educated workforce," Peterson said. "This collaborative effort will facilitate job creation and global competitiveness and is a component of Georgia Tech's strategic plan."

To further strengthen Tech's manufacturing portfolio, Ben Wang was appointed the Institute's chief manufacturing of-



Ben Wang

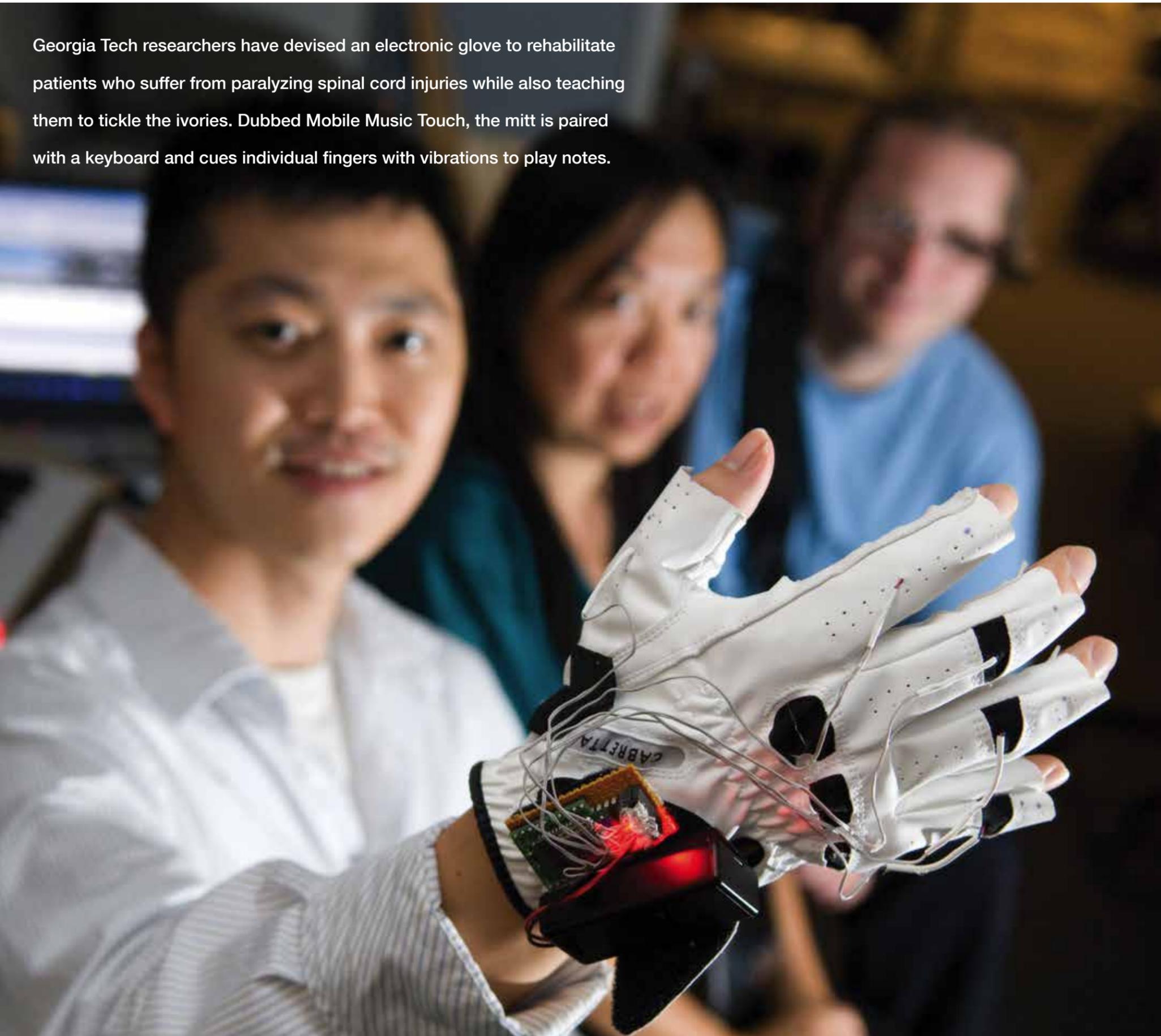
ficer, executive director of the Manufacturing Research Center, and the Eugene C. Gwaltney Jr. Chair in Manufacturing Systems in the School of Industrial and Systems Engineering.

"The strength of an institution lies in its ability to recruit great educators and leaders," said College of Engineering Dean

Gary May. "Ben is an outstanding scholar and a trailblazer in his field, and manufacturing leadership is a critical issue for national competitiveness. I am excited about the great opportunities that I see arising from his efforts."

"Over the last thirty years, I have worked in various positions related to manufacturing—from operations and planning to strategy and policy," said Wang, whose primary research interest is in applying emerging technologies to improve manufacturing competitiveness. "The approach we will take to reaching the center's goal of becoming the world's manufacturing thought leader and trendsetter is to create an innovation ecosystem. We will add substantial commercial, economic, and societal values to Tech professors' inventions to license the technology to a company, create a joint venture, or form a new spin-off company." ■

Georgia Tech researchers have devised an electronic glove to rehabilitate patients who suffer from paralyzing spinal cord injuries while also teaching them to tickle the ivories. Dubbed Mobile Music Touch, the mitt is paired with a keyboard and cues individual fingers with vibrations to play notes.



HELPING ECONOMIES THRIVE

More than 125 years after its founding, Georgia Tech continues to break new ground in providing innovative assistance to businesses and entrepreneurs. As one of the top ten patent-producing universities in the country, Georgia Tech is positioned to become the nation's "Innovation Institute," largely through Tech's significant and ongoing efforts to accelerate its future economic and innovation impacts via developing more entrepreneurial talent, increasing university-industry connections, and improving venture capital funding in Georgia. This vision is bolstered by the Institute's extensive and highly regarded portfolio of commercialization, research, and policy expertise.

Commercialization

The National Science Foundation (NSF) recently recognized Georgia Tech's long-standing leadership role in commercializing new technologies by naming the Institute a Regional Center for its Innovation Corps (I-Corps) program. I-Corps is designed to bring together the technological, entrepreneurial, and business know-how to quickly bring discoveries ripe for innovation out of the university lab and into the marketplace.

"Being designated as an I-Corps Regional Center is very exciting and potentially transformational for Georgia

Tech and Atlanta," said President G. P. "Bud" Peterson. "While the knowledge gained from basic research will always be critical to the advancement of particular disciplines, some of those results also show immediate potential for broader applications and impact in the business world. The I-Corps support will help Georgia Tech researchers and entrepreneurs translate those results into technologies with near-term benefits for the economy and society."

Several months prior to the I-Corps Regional Center designation, NSF

Panasonic opens R&D center in Tech Square

A collaboration among Georgia Tech, the Georgia Department of Economic Development, and the Metro Atlanta Chamber proved to be a key factor in the decision by Panasonic Automotive Systems Company of America to establish a new research center in Technology Square.

The Panasonic Innovation Center is an incubator for next-generation automotive infotainment and other technologies. The company expects to have forty software, electrical, systems, and mechanical engineers and other support personnel working at the center—and to offer at least fifteen co-op positions a year to Georgia Tech students. Specialists from Georgia Tech's Enterprise Innovation Institute helped identify Georgia Tech resources of interest to Panasonic and connect the company to Georgia Tech leadership.

Panasonic Automotive considered three sites in Midtown, ultimately selecting the Centergy One office building at Georgia Tech—a powerhouse of technological talent and research.

Georgia Tech is one of the nation's largest advanced sciences and technology research universities, said Stephen Childs, director of human resources at Peachtree City-based Panasonic Automotive Systems, a division of Panasonic Corporation of North America.

"The No. 1 reason to locate in Midtown Atlanta is to attract and hire the top engineering talent in one of the fastest-growing technology areas of the nation," Childs said. "We will perform a lot of design verification testing and would love to leverage the co-op students to perform much of that, and at the same time provide them with some valuable knowledge and experience. Those students could also serve as a feeder pool for future employees." ■



announced that Georgia Tech was one of twenty-one teams in the inaugural class of I-Corps awards. The selection includes \$50,000 in funding to help develop scientific and engineering discoveries into useful technologies, processes, and products. Beth Mynatt, executive director of Georgia Tech's Institute for People and Technology (IPaT) and a professor in the College of Computing, is the principal investigator for the I-Corps initiative.

Augmenting the work of I-Corps, Georgia Tech Integrated Programs for Startups (GT:IPS) is helping to jump-start the process of creating startup companies. GT:IPS provides the training and support that Georgia Tech entrepreneurs need to launch companies based on Tech intellectual property.

In order to "graduate" from the program, inventors present Tech's Office of Innovation Commercialization and Translational Research with a vetted business plan, approved management team, conflict of interest declaration, and a list of potential funding sources. After graduation, the company can enter into an express licensing agreement that requires no negotiation, drastically reducing the time it takes to finalize a deal.

The GT:IPS license is only available to Georgia Tech faculty, staff, and student entrepreneurs and is completely optional.

Additionally, Georgia Tech is pursuing other opportunities with the National Heart, Lung, and Blood Institute of the National Institutes of Health and other federal agencies.

A startup company based on technology developed at Georgia Tech, Pindrop Security, offers a solution to the growing challenge of telephone security. For major

financial services companies, being sure that an incoming phone call is really from a customer and not an overseas criminal intent on fraud is a growing concern as the telephone system adopts Internet technologies—and the security issues that come with them.

Using "acoustic fingerprint" detection techniques developed in the Georgia Tech Information Security Center, Pindrop says it can restore trust to the telephone network and help stem the tide of phone fraud.

Supported by a broad range of Georgia Tech initiatives, Pindrop was chosen as a top ten "most innovative company" at one of the most prestigious information security events, the RSA Conference.

"We provide a way to detect, mitigate, and stop phone fraud by identifying the characteristics of any phone call based on the device making it or the path the call takes," said Vijay Balasubramanian, Pindrop's CEO, who helped develop the technology as a Tech PhD student in computing. "This information is useful in providing both forensic information about the call—whether it is from a landline, cell phone, or voice-over-IP device—and the geography of the origin."

Research

Transportation infrastructure concerns rank as one of the top issues in Georgia and the Southeast. The designation of Georgia Tech as the lead for one of ten national Tier One University Transportation Centers (UTC) by the U.S. Department of Transportation (US DOT) represents a positive step toward developing solutions to transportation challenges facing the state and region.

Funded by a \$3.5 million federal grant and an additional \$3.5 million in matching funds from the state, the Woodruff Foundation, and others, the UTC will bring together a consortium of universities in Georgia, Florida, and Alabama. Known as the National Center for Transportation System Productivity and Management, the Georgia Tech UTC will focus on transportation issues of importance to the nation, state, and metropolitan areas.

In a related program, Georgia Tech has also been named as a collaborator in the US DOT's Regional UTC led by the University of Florida. The University of Florida and Georgia Tech will be joined by six other universities to form a regional consortium that will focus on transportation issues impacting the Southeast.

"Georgia Tech is uniquely qualified to lead the University Transportation Center. It is home to one of the largest and most accomplished transportation and logistics research programs in the U.S. and is responsible for many of the strategic improvements that have been made to Georgia's infrastructure," said Governor Nathan Deal. "I applaud the efforts of all of those who were involved in this important project."

In the healthcare arena, Georgia Tech and Gwinnett Technical College, part of the Atlanta Health Information Technology (HIT) cluster, were awarded a \$1.65 million grant to enhance the state's capabilities in this sector. The initiative is part of the federal government's Jobs and Innovation Accelerator Challenge, a tri-agency competition initiated to support the advancement of 20 high-growth, regional industry clusters. The Atlanta HIT

Georgia Tech's designation as the lead for one of the ten Tier One University Transportation Centers is a major step toward developing solutions to longstanding transportation challenges.



cluster's proposal was one of 20 selected from 125 applicants.

The collaborative program, designed to quickly create jobs to fill demand in Georgia's expanding HIT cluster, provides a commercialization pathway for the supply-side and training for the workforce on the provider side. The initiative also provides technical assistance to traditionally underserved businesses throughout the state's economically distressed areas.

"Our ultimate goal is simple—to achieve higher-quality, lower-cost, and more patient-centric healthcare throughout Georgia," said Steve Rushing, director of HIT initiatives at Tech's Enterprise Innovation Institute, who will serve as general advisor for the integrated project

plan. "Through extensive collaboration and partnerships, this initiative leverages existing resources to boost job creation through technology deployment, and thus economic development."

Policy

Reflecting the Institute's growing reputation as a thought leader in technology and economic policy, Georgia Tech was among the top U.S. universities invited to be part of the World Economic Forum's Knowledge Advisory Board. This group of senior representatives from the foremost 200 universities worldwide advised the forum on how to engage with academic partners and the field of higher education.

Continued on the next page

Georgia Tech has established a set of strategic collaborations with the World Economic Forum, a Geneva-based non-profit organization that focuses on the most pressing issues facing the world.

“The World Economic Forum (WEF) is the premier convener of thought leaders around the world,” said Steven McLaughlin, Georgia Tech’s former vice provost of international initiatives and current chair of electrical and computer engineering. “Having Georgia Tech as the only public university in that group expands our global impact and influence, and connects us to an important international network of leaders.”

McLaughlin traveled to Geneva last fall to represent Georgia Tech on the Knowledge Advisory Board.

In January 2012, President Peterson attended the WEF’s principal meeting in Davos, Switzerland, where (as one of twelve university presidents) he interacted with the world’s thought leaders from industry, government, and education.

The partnership between Georgia Tech and the World Economic Forum has yielded other initiatives. Several Georgia Tech faculty members, for example, participated in the annual meeting of the New Champions in Dalian, China, in September 2011.

Known as “Summer Davos,” the New Champions annual meeting is the foremost global business gathering in Asia and is designed to foster interaction, generate insight, and achieve impact

across the more than 1,500 participants attending.

Much closer to home, the President’s Council of Advisors on Science and Technology (PCAST) Working Group on Advanced Manufacturing held its first regional meeting at Georgia Tech last fall. Attendees shared thoughts on technology development, education and workforce development, facility and infrastructure sharing, and policies that could create a fertile environment for innovation.

The Advanced Manufacturing Partnership (AMP)—launched by President Barack Obama in summer 2011—is a national effort bringing together the federal government, industry, universities, and other stakeholders to identify and invest in emerging technologies with the potential to create high-quality domestic manufacturing jobs and enhance the global competitiveness of the United States. ■



Professor Ian Bogost, director of Georgia Tech’s Digital Media program, discussed the distinction between traditional media and gaming at the World Economic Forum.

Georgia Tech is a partner in the Trade & Logistics Innovation Center in Mexico City.



For a quarter of a century, Georgia Tech has fostered global alliances in an effort to enhance student learning, build research collaborations, and promote economic development. Our strategic plan envisions the Institute becoming an international hub for education, research, and innovation, and we took significant steps toward fulfilling that goal this year.

Trade and Entrepreneurism

Last fall Georgia Tech and Tecnológico de Monterrey launched the Trade & Logistics Innovation Center in Mexico City. The center, a partnership between the two institutions, is focusing on improving Mexico’s logistics performance and increasing trade competitiveness.

“In order for us to continue our global positioning, we have to understand the supply chain from an international perspective,” said Jaymie Forrest, managing director of the Georgia Tech Supply Chain & Logistics Institute. “It is essential that there be in-depth knowledge of major trading partners such as Mexico for Georgia Tech to be the leader in international trade.” The center is focused on education, research, and industry growth.

“We’re providing education and research to make sure Mexico has the capacity to do it on its own,” said Miguel Martinez, executive director of the center. “The fact that an institution like Georgia Tech is involved will help us get there faster with proven methodologies and success in other countries.”

The center will offer professional and executive education on logistics and trade, the same extensive curriculum offered by the Supply Chain & Logistics Institute. That includes comprehensive programs in lean supply chain, transportation, warehousing, inventory, trade, and supply chain strategy.



Delivery via helicopter is vital to an innovative Georgia Tech project that provides disaster relief supplies.

For its research agenda, the center will work on projects with the Mexican government in areas such as disaster management and humanitarian logistics and improvement of the food and beverage supply chains. The center's research areas will also include warehouse distribution and logistics, logistics and manufacturing, supply chain for emerging economies, and information technologies for supply chain management.

Encouraging entrepreneurial activity in Chile is the current focus of Tubing Operations for Humanitarian Logistics (TOHL), a team of students and alumni who relocated to the South American nation for six months as part of a program initiated by the Chilean government.

In a post-disaster environment, getting potable water to areas cut off by destroyed roads and infrastructure can be both time-consuming and ultimately fatal for many. The TOHL team—which includes recent Ivan Allen College of Liberal Arts graduates Travis Horsley and Melissa McCoy—has developed a system to address those logistical issues in the wake of disaster, and earned \$40,000 from Startup Chile to further develop its idea.

TOHL makes use of coil tubing typically used in oil fields and employs a helicopter

to drop and arrange tubing from above, creating a way for water to reach remote places following a disaster. The tubing, measuring about an inch in diameter, stays above ground and the process can result in getting water to a community within 48 hours. It's durable enough to be used for up to 100 years with oil, though this application shortens its life span. Using a helicopter to unspool the tubing removes the obstacle of roads or paths that may be blocked, washed out, or destroyed.

"Chile is the perfect place for us [to test TOHL]," said McCoy. The country's recent earthquakes and forest fires provide the team with an opportunity to test its system in a place that has experienced the disasters that TOHL aims to address.

"Right now we want to show that it works, and from that try to partner with [non-governmental organizations] and have the pipe get water to a community that needs it," McCoy said.

The TOHL team will convene with more than 200 other entrepreneurs from around the globe as part of the project.

Humanitarian Outreach

In addition to economic development, humanitarian outreach is a key aspect of Georgia Tech's global initiatives.

Researchers from the College of Computing, working in partnership with the U.S. Centers for Disease Control and Prevention (CDC), have developed a digital data tracking system to assist low-resource clinical laboratories in developing countries.

Sub-Saharan Africa suffers from some of the greatest health challenges in the world, making the need for efficient healthcare delivery especially vital. However, most hospitals and labs in the region use paper logs and manual entries for tracking data, methods that take up valuable time and are prone to errors and loss of data. In an effort to increase efficiency and allow more patients to be tested accurately, a team led by Professor Santosh Vempala in the School of Computer Science developed the Basic Laboratory Information System (BLIS).

During a six-month pilot implementation in three hospital labs in Cameroon, BLIS accounted for a 66 percent decrease in errors and a 50 percent reduction in employee workload. This led to significantly reduced waiting times, allowing twice as many patients to get tested daily as compared to pre-BLIS operations.

Built from freely available, open-source components, BLIS digitizes the traditional data tracking system, resulting in a sustainable program that tracks specimens, results, and workflow. Unlike similar software from commercial providers, BLIS is extremely cost-effective, works on limited resources, and requires virtually no training. Additionally, the system is designed to work effectively in

countries with very little IT infrastructure and limited connectivity.

"Integrating data tracking software in these labs has been difficult in the past, mainly due to high costs and the failure of other system providers to incorporate the varying needs of labs and hospitals from different countries and cultures," said Vempala. "We wanted to design an extremely configurable system that would adapt to fit the needs of its users in order to improve workflow and patient care."

Another Georgia Tech innovation is helping resource-poor nations in the developing world improve distribution of breast milk and non-pharmaceutical interventions for malaria. This critical goal is being achieved through the work of Georgia Tech systems engineers, who are using computer models to help these nations improve supply chain decisions.

"We are using mathematical models implemented in user-friendly tools like Microsoft Excel to improve the allocation of limited resources across a network, especially in resource-poor settings," said Julie Swann, associate professor of industrial and systems engineering. "We wanted to determine how we could provide breast milk to the most people while also being geographically equitable in terms of access. We looked at the cost of equity and how that changed the distribution design."

In another project, the Caribbean Hazard Assessment Mitigation and Preparedness (CHAMP) initiative, Swann's team evaluated the existing hospital networks and other healthcare provider locations described in Puerto Rico's emergency preparedness plans. They found that technology innovations such as mathematical models can help solve problems in global and public health, such as the allocation of limited healthcare resources.

On the other side of the globe, Japan is still feeling the effects of the 2011 Tohoku tsunami, the nation's deadliest in more than 100 years. Despite an extraordinary level of preparedness by the Japanese, the tsunami caused more than 90 percent of the almost 20,000 fatalities that resulted.

Hermann Fritz, associate professor of civil and environmental engineering, has mapped the height and flood zone of the tsunami to learn more about the flow of the devastating currents. Fritz used eyewitness video and terrestrial laser scanners from atop the highest buildings that survived the tsunami to accomplish his task.

"What we can learn from the hydrograph is confirmation that the water goes out first, drawing down to more than negative three meters on the landward side of the trench, which can make vessels hit ground inside harbors," Fritz explained. "During the subsequent arrival of the main tsunami wave, the water rushing back in changed the water level by forty feet, engulfing the entire city in twelve minutes."

Understanding tsunami velocity will help prepare for future disasters—whether it's designing buildings high enough to serve as vertical evacuation points, or sea walls and breakwaters strong enough to control the flow of water.

"The ultimate goal is to save lives," Fritz said. "In order to do so, we have to have a better understanding of what worked and didn't work. This is the first time we've been able to look at the structural infrastructure designed to protect coastal towns from tsunamis and examine why it didn't work. There's a lot to learn in terms of surviving tsunamis and protecting, evacuating, and ultimately saving lives. ■

Friends Beyond Borders offers multilingual forum

Every couple of weeks in the courtyard outside the O'Keefe building, people of all ages take part in a language development exercise reminiscent of the biblical Tower of Babel.

"If you come over here during a session, you wouldn't think you're in Georgia," said Adria Motiwalla, student services coordinator at the Georgia Tech Language Institute. Those participating in these multilingual conversations are part of the Language Institute's Friends Beyond Borders Language Cafe. This conversation program provides an opportunity for students, faculty, and staff from around the globe to socialize and brush up on second language skills.

The Language Institute hosts recent high school graduates, college students, and professionals from abroad who come to the United States either on short-term scholarships or to spend time learning English before applying to an undergraduate or graduate program stateside.

"I think there's a lot of credibility with the name Georgia Tech, so students want that on their transcript," Motiwalla said. "We have students transferring in from all over the planet saying they're not getting quality English elsewhere."

College students and business types also use the center to hone English skills for a professional environment. The largest cohorts speak Arabic, Korean, and Spanish, but other languages heard at the Institute include French, Portuguese, Chinese, Thai, and Japanese.

What the Language Institute needs more of is English speakers.

"We'd love to have staff who travel for Tech and maybe want to brush up on a language," Motiwalla said. The program welcomes all students, faculty, and staff who want to improve and practice a second language.

For those looking for a more in-depth conversational experience, the Language Institute also offers a conversation partner program that matches speakers through an online system.

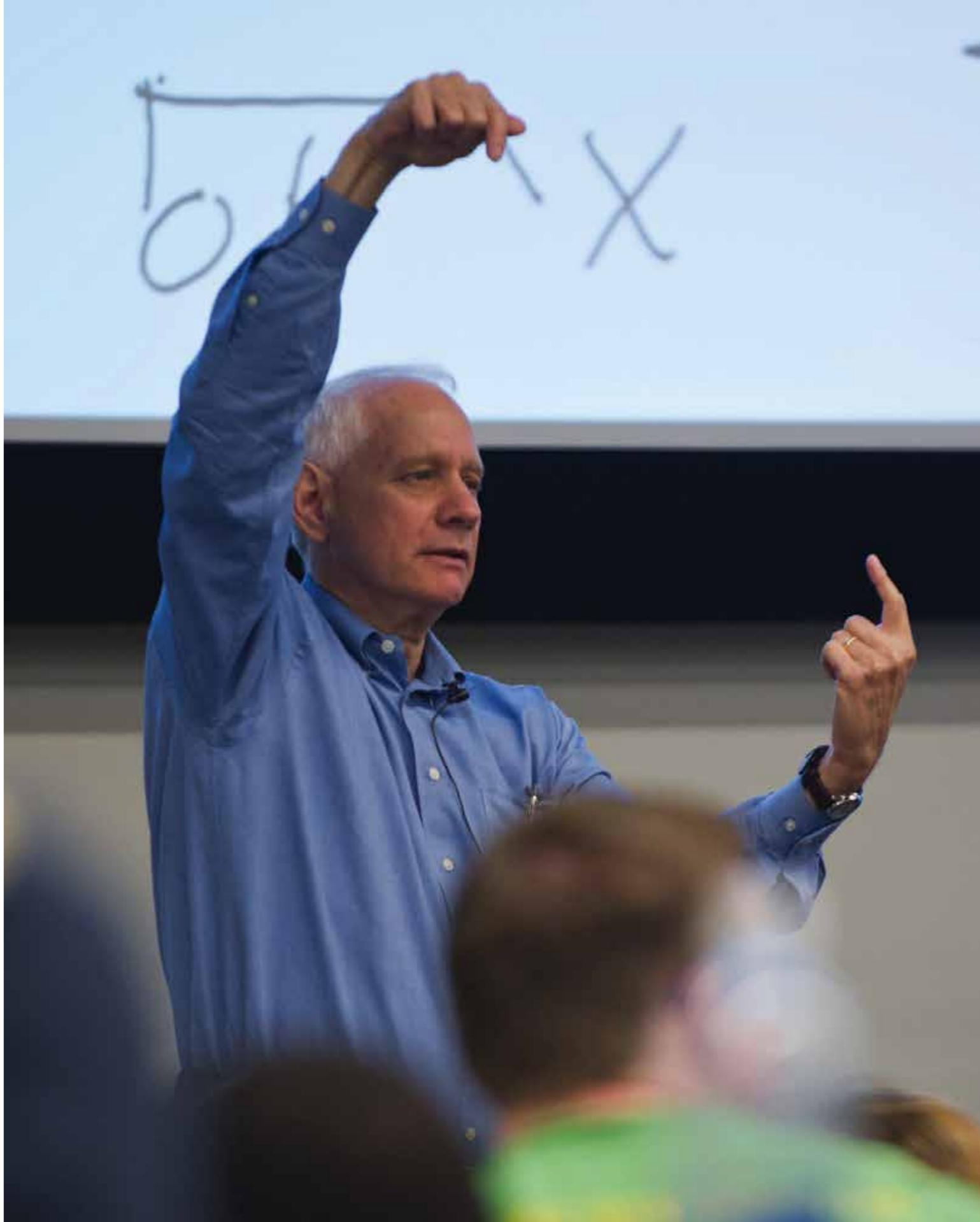
"It's a tool to meet somebody on campus and develop a friendship, with the goal of hopefully meeting a speaker with whom you can do a language exchange," Motiwalla said. ■

MASTER SCHOLAR-TEACHER

Before returning to his first loves of teaching and research in 2010, Professor Gary Schuster served as interim president, provost, and —for more than a decade— dean of the College of Sciences. Schuster offers students the powerful blend of an eternally curious research scientist and a tirelessly passionate educator of undergraduates. The Vasser Woolley Professor at Georgia Tech, Schuster focuses his research on oxidative damage to DNA and on conjoined DNA/ conducting polymers.



Gary Schuster served as interim president in 2008-09.



CELEBRATING FACULTY AND STAFF ACHIEVEMENTS

The global prestige and visibility that Georgia Tech enjoys would not be possible without the vision and drive of the Institute's world-class faculty and staff. Their achievements and accomplishments bring recognition to themselves and to the larger Tech community.

Thought Leadership

Professor Gilda Barabino was elected president of the Biomedical Engineering Society, for which she had previously served as a board member and treasurer.

Barabino's plans for her presidency include the promotion of partnerships between the national society and other professional societies and with other organizations that support the discipline. She is also considering the idea of introducing biology, medicine, and engineering disciplines at the K-12 level.

"Children are naturally inquisitive about the world," Barabino said, "and so we need mechanisms in place to help them explore. There are many students who are interested in medicine but do not realize the scope of professions it encompasses. We can help them learn that there are other ways of being involved in medicine."

Associate Professor of International Affairs Danny Breznitz testified before the Senate's U.S.-China Economic and Security Review Commission on the need for the United States to refocus its economic perspective in order to compete with China.

"A pervasive misconception among policy makers and academics has made

excelling in innovation—defined solely as the creation of new technologies, services, and products—the holy grail of economic growth," said Breznitz, an expert in globalization and rapid innovation-based industries. "Accordingly, too often conversations about innovation focus on novel breakthrough developments that give rise to 'game-changing' technology."

Breznitz outlined four central points that the commission should consider about China's innovation capabilities and the real challenge they present for the United States:

- Globalization has changed the manner in which innovation is carried out around the world.
- The rise of global fragmented production of both goods and services has led, for the first time in history, to true economic international interdependency with economic and political implications.
- China's true innovational competitive edge, and the real competitive challenge to the United States, is mastering the art of second-generation



Barabino Breznitz McLaughlin Bellamkonda Xia Westdickenberg Houston



Sherrill Riggle Butler Logan O'Connor Baines Ervin

innovation. . . and the science of organizational, incremental, and process innovation.

■ The United States should focus less on China's attempt to outdo Silicon Valley and more on China's capabilities in the commercialization, improvement, and application of technologies first developed in the United States. This is our real long-term challenge and the key one if we wish to capture more of the value, including job creation effects, of our own novel innovations.

Steve McLaughlin, former vice provost for International Initiatives, addressed the French National Assembly in Paris.

McLaughlin's presentation was part of the inaugural French-American Parliamentary meetings symposium that focused on strengthening community, educational, and university cooperation between the two countries. He participated on a panel that provided insight on existing French-American academic exchanges and how to strengthen these programs and develop new opportunities.

Honors

Professor Ravi Bellamkonda was named the first Carol Ann and David D. Flanagan Chair in Biomedical Engineering in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University. The award—made possible by a \$1.5 million gift from the

Flanagans—recognizes Bellamkonda's scholarship and thought leadership in regenerative medicine, nanotechnology, and cancer research and will support his active research program.

Bellamkonda directs the Neurological Biomaterials and Cancer Therapeutics Laboratory, a part of the Laboratory for Neuroengineering in the Biomedical Engineering Department. He also serves as associate vice president within the Office of the Executive Vice President for Research.

Yunan Xia, an internationally recognized leader in the field of nanotechnology, was named the first GRA Eminent Scholar in Nanomedicine.

Xia's research focuses on nanocrystals—a novel class of materials with features smaller than 100 nanometers—as well as the development of innovative technologies enabled by nanocrystals. These technologies span the fields of molecular imaging, early cancer diagnosis, targeted drug delivery, biomaterials, regenerative medicine, and catalysis.

"The possible applications of nanotechnology in medicine have only begun to be explored," said Michael Cassidy, president and CEO of the Georgia Research Alliance. "Dr. Xia's expertise and collaborative vision will lead to vital new scientific discoveries that can be transformed into new tools to help people live healthier lives."

Maria G. Westdickenberg, associate professor of mathematics, received a

Presidential Early Career Award for Scientists and Engineers (PECASE). The award is the highest honor bestowed by the U.S. government on science and engineering professionals in the early stages of their independent research careers.

"I am very honored to receive this award, particularly because of its combined focus on research, education, and outreach," said Westdickenberg. "As consuming and vital as research is, I think the call to train and inspire our young people and to reach out to underrepresented groups is equally vital. I am honored to be mentioned in the context of that effort."

The American Chemical Society (ACS) named College of Sciences Dean and Chemistry Professor Paul Houston and Chemistry Professor David Sherrill as fellows for 2011. They were honored for their work in chemistry as well as their contributions to society.

"ACS is especially proud to honor these chemists during the 2011 International Year of Chemistry," said ACS President Nancy Jackson. "The work they are doing will improve all of our lives as they unleash the power of chemistry to solve global challenges like providing clean water, sufficient food, new energy sources, and cures for disease. They're also organizing scientific conferences for their peers, doing outreach with schools, and being mentors to the next generation of scientists."



Recognition of Staff

In addition to the awards and honors received by faculty, the work of professional staff is crucial to Georgia Tech's ability to fulfill its mission. A number of our staff members received prominent recognition for their accomplishments during the year.

Colleen Riggle of the Women's Resource Center, Kate Wasch of the Legal Affairs Office, Carmen Butler of the Office of Human Resources, and the faculty and staff of the School of Aerospace Engineering were recognized by NASA for their efforts in assisting the space agency in the testing of its Title IX compliance efforts. Title IX, which prohibits discrimination in federally supported educational programs on the basis of sex, is one of Georgia Tech's most significant compliance and diversity responsibilities. NASA provides significant research funding to the School of Aerospace Engineering.

In addition to compliance with federal law, ensuring the security of Georgia Tech's cyber infrastructure is a high institutional priority. James Logan, quality assurance manager in the Enterprise Information Systems unit of the Office of Information Technology, was recognized by *U.S. Black Engineer* magazine for his leadership in these efforts. Logan and his team oversee quality assurance and development of web-based issues, errors, and test cases.

In addition, Georgia Tech's information

security initiatives—led by Vice President James O'Connor and Director of Information Security Herbert Baines—were praised in a KPMG assessment. "The maturity of the information security program is ahead of peer institutions and the rest of higher

education," the report stated. "Many of the programs under the information security plan serve as a model for the University System of Georgia and other higher education institutions." ■

Tech's innovative faculty retirement practices recognized

Georgia Tech has received a \$100,000 grant from the American Council on Education and the Alfred P. Sloan Foundation for its innovative work in faculty retirement.

Along with fourteen other institutions honored, Georgia Tech demonstrated a best practice in three stages in culmination of faculty careers: the development of a legacy, the transition into retirement, and the continuing involvement of faculty in the academic community post-retirement.

Georgia Tech was recognized for offering a phased retirement program that allows the Institute to expend work involvement at 49 percent after completion of a mandatory hiatus. In addition, Georgia Tech allows faculty members to opt out of the defined benefits plan and to select a defined contributions plan that is appealing to those faculty members who may not stay for ten years, the mandatory time required to vest in the traditional plan. Optional contributions to retirement accounts and the choice to use a high-deductible health plan also allow faculty to boost their savings.

Future plans include surveying faculty to determine their level of knowledge and satisfaction regarding their retirement options. There are also proposals to more formally incorporate retirees as mentors for younger faculty members.

"As part of the Georgia Tech Strategic Plan, the Institute is in relentless pursuit of institutional effectiveness," said Vice President for Institute Diversity Archie Ervin. "This award is one example of how Georgia Tech strives to ensure that we are implementing the best practices and ensuring faculty have options as they retire."

"Our intent in funding these awards is to broaden the national conversation and the agenda within higher education to take into account the full scope of the culminating stage of faculty careers," said Kathleen Christensen, Working Longer program director at the Alfred P. Sloan Foundation. "We are hopeful these award-winning institutions can provide examples for our community of thoughtful approaches that can be modeled." ■

Providing the highest-quality technological education and maintaining the most cost-effective operation requires ongoing evaluation of Georgia Tech's organizational structure. "Relentlessly Pursue Institutional Effectiveness" is one of the five goals of our strategic plan, and much of that effort has borne fruit this year.

Strategic Alignment

Since the arrival of President G. P. "Bud" Peterson in 2009, the Institute's primary administrative units have examined their structures and realigned them in accordance with the strategic plan.

Last fall the Office of the Provost announced a structural realignment that eliminated a layer of senior management, reduced the number of vice provosts, created a new office dedicated to graduate student and faculty affairs, and grouped similar functions to create efficiencies. These actions have also resulted in substantial cost savings for the Office of the Provost.

Just a month later, the Division of Administration and Finance followed suit with the announcement of an updated structure. The position of senior vice president for Administration and Finance was expanded to oversee the Institute's Office of Financial Services, Real Estate Development, and the Institute Strategic Resource Management Office (ISRM). Within this framework, Institute Budget and Planning, Institutional Research and Planning, Capital Planning and Space Management,

Environmental Stewardship, and Organizational Development were organized into ISRM, enabling more efficient support of the Office of the President.

The Office of the Executive Vice President for Research (EVPR), established in 2010, now has central oversight of all Georgia Tech research units and activities, which consist of the Georgia Tech Research Institute, the Enterprise Innovation Institute, the interdisciplinary research centers, and the Georgia Tech Research Corporation.

Georgia Tech-Savannah/ Professional Education

The summer 2011 adoption of a task force report titled "Defining a Path Forward for Georgia Tech-Savannah" brought clarity not only for the Savannah campus, but also for the Atlanta unit formerly known as Distance Learning and Professional Education (recently renamed Georgia Tech Professional Education, or GTPE).

Ultimately, the Institute's leadership opted to incorporate Georgia Tech-Savannah under the GTPE umbrella, led



by GTPE Dean Nelson Baker. Earlier in the year, Baker had been charged with leading the transition and implementation process outlined in the task force report, which recommended creating a new academic and operational model for the Savannah campus while phasing out current degree programs.

"The Professional Education operation is in line with the vision we have for Savannah," said Provost Rafael Bras. "Nelson and his team will bring their experience, vision, and leadership to our presence there."

The new organization, designed to be viable and self-sustaining, includes

a portfolio of programs ranging from co-curricular undergraduate activities to instruction for the military and executive and other non-credit education programs to professional master's degrees. Recommendations also include the option of developing regional research opportunities.

Georgia Tech-Savannah began offering professional education classes in fall 2012 in the areas of OSHA, LEAN Healthcare, supply chain logistics, and project management, with additional programs to be scheduled in the future. The Savannah campus will also continue to deepen engagement with the

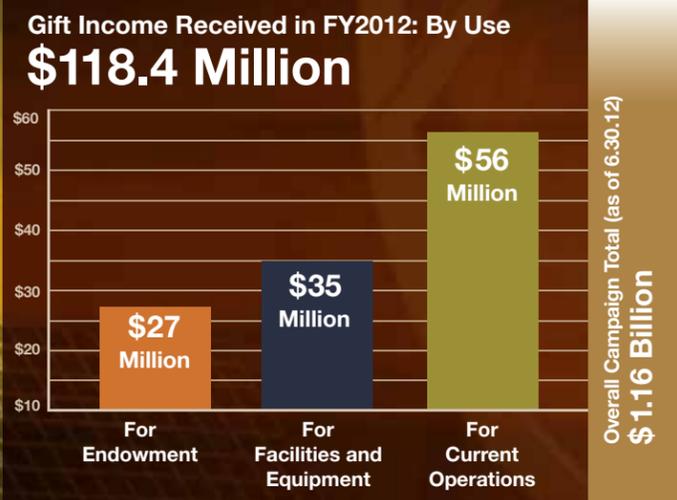
community via partnerships with industry, other educational institutions, K-12 outreach, and the military.

"Industry and military organizations, along with the Georgia Tech enterprise, are expressing interest in this new model," said Baker. "Initial program ideas already demonstrate how it will be beneficial to Savannah, the region, and beyond. More importantly, it is creating an open dialogue for participation, which will be essential for future success." ■

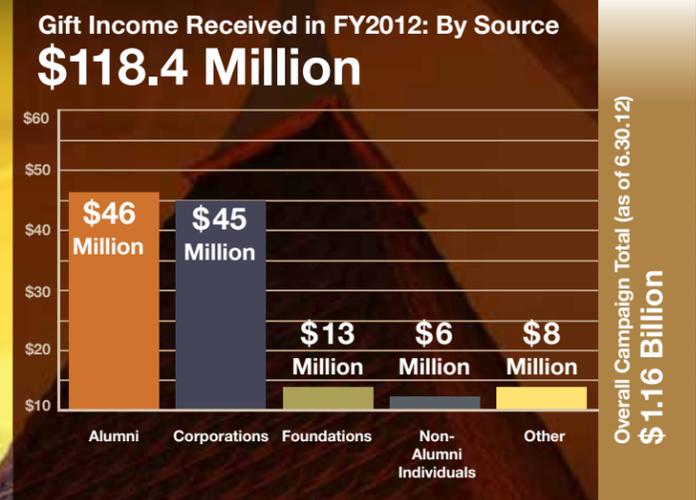
DEFINING A PATH FORWARD FOR GEORGIA TECH-SAVANNAH

The new organization, designed to be viable and self-sustaining, includes a portfolio of programs ranging from co-curricular undergraduate activities to instruction for the military and professional master's degrees.





As reported to the Council for Aid to Education (CAE), which measures only gifts received, excluding pledges.



As reported to the Council for Aid to Education (CAE), which measures only gifts received, excluding pledges.

MAXIMIZING PHILANTHROPIC SUPPORT

Despite an economy that continues to be sluggish, Georgia Tech posted the second best year-to-year philanthropic results in Institute history for Fiscal 2012. Private gift income to the Institute and its associated foundations totaled \$118.4 million.

A Banner Year

“Georgia Tech alumni and friends have a longstanding tradition of generously supporting the Institute. Given the visionary aspirations articulated in our twenty-five-year strategic plan, private philanthropy is more crucial now than ever before,” said President G. P. “Bud” Peterson. “I am very pleased—but certainly not surprised—to see that our community’s robust philanthropic track record grew even stronger last year.”

Within the \$118.4 million total, \$5 million was given for unrestricted current operations and \$1 million for unrestricted endowment, with the balance for restricted purposes. By use, \$56 million was directed to current operations, \$27 million for permanent endowment, and \$35 million for facilities and equipment. Programmatically, highlights include \$42 million designated for the College of Engineering, \$15 million for the newly named Scheller College of Business, and \$19 million for intercollegiate athletics.

The largest sources of funding were alumni and corporations, providing \$46 million and \$45 million, respectively, of the total. Alumni participation is anticipated to be among the highest within all public universities nationwide. Current and emeritus trustees of the Georgia Tech

Foundation provided \$13 million in gifts.

The highlight of the year was the June 2012 announcement of a \$50 million gift from 1952 alumnus Ernest Scheller Jr., an unprecedented act in the Institute’s philanthropic history and the catalyst for renaming the College of Management as the Ernest Scheller Jr. College of Business.

The transformational Scheller commitment has already begun to have an impact on the College, adding numerous faculty chairs and professorships, undergraduate scholarships, graduate fellowships, and a dean’s discretionary endowment fund.

Campaign Georgia Tech continued its progress toward its expanded goal of \$1.5 billion, crossing the \$1 billion mark and keeping pace at an average rate of nearly \$3 million per week.

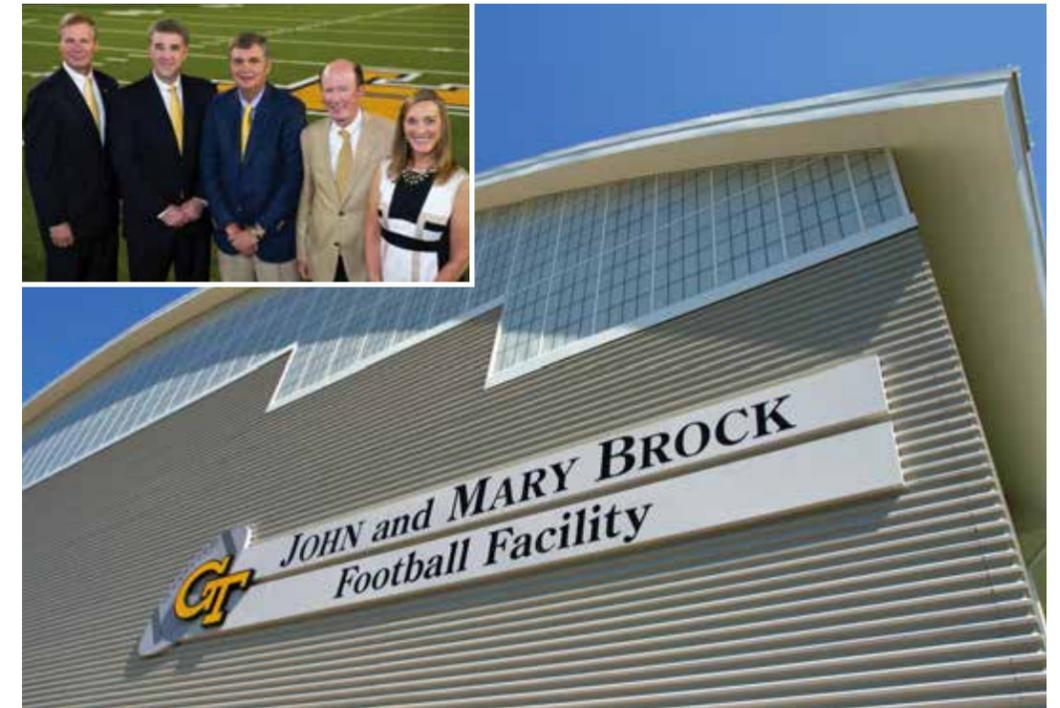
“Despite the uncertainty of the financial markets regionally, nationally, and internationally, philanthropy to the Institute continues strong across all constituencies,” said Vice President for Development Barrett H. Carson. “Facilities construction, endowed faculty chairs and professorships, and endowed undergraduate scholarships and graduate fellowships remain at the core of philanthropic objectives.”

Philanthropy has also played a major role in the construction and renovation

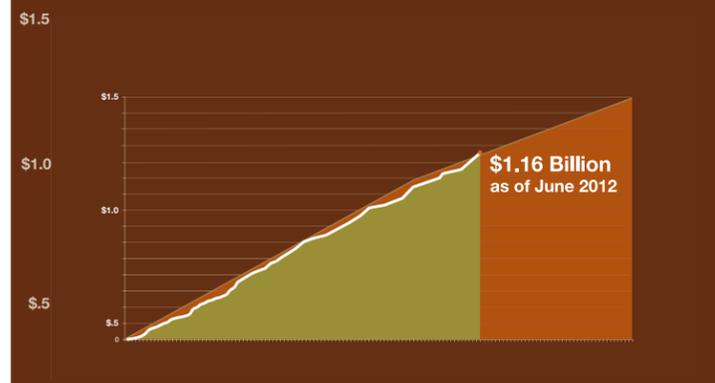


THE SCHELLER LEGACY

Ernest Scheller Jr.— pictured with his wife Roberta—has transformed the College of Business with his unprecedented level of philanthropy.



Campaign Georgia Tech



■ AVERAGE REQUIRED ■ FUNDS RAISED

of campus facilities, helping to further Tech's strategic vision and competitiveness. Examples of facilities in various stages of planning, design, construction, and completion during the year include:

- G. Wayne Clough Undergraduate Learning Commons
- John and Mary Brock Football Facility
- McCamish Pavilion
- Ken Byers Tennis Complex
- Noonan Golf Facility

“When Campaign Georgia Tech was publicly launched in 2010, we asked our alumni and friends to step forward and affirm their belief in Georgia Tech’s ability to transform lives through education, research, and service,” said alumnus John F. Brock III, who is co-chairing the \$1.5 billion Campaign Georgia Tech with his wife, Mary. “The response to our call to action has been tremendous, making crystal clear just how strong the Tech family’s commitment is to ensuring that our great university continues to thrive in the twenty-first century.” ■



Georgia Tech’s mission is three-pronged: education, research, and service—and we take the third element of our mission just as seriously as the other two. The Institute provides vital support to our local, state, and regional communities not only because it’s the right thing to do, but that support is also multiplied exponentially. The return on these investments is substantial.

Education

As one of the nation’s top-ranked public universities, Georgia Tech provides the lion’s share of its community support services in the form of education.

The Institute is already renowned for providing K-12 students with learning opportunities that encourage them to pursue advanced studies in STEM (science, technology, engineering, and mathematics) fields and for supporting teacher professional development in the STEM disciplines. As a result, in partnership with the Georgia Department of Education, Georgia Tech will receive \$7.5 million in funding through the U.S. Department of Education’s Race to the Top program to expand STEM programs through its outreach center, the Center for Education Integrating Science, Mathematics, and Computing (CEISMC).

In addition to the introduction of new engaging and rigorous courses for students, the Institute’s initiatives will be based on the NASA

Electronic Professional Development Network model provided through Georgia Tech Professional Education for teachers pursuing advanced courses. Georgia Tech will also continue to expand the Georgia Intern-Fellowships for Teachers (GIFT) program that places high school STEM teachers as partners in STEM-focused summer internships in industry and university research.

“Through this program, we are able to increase access to STEM education for both K-12 teachers and students throughout the state, helping not only those individuals, but also improving Georgia’s competitiveness by creating a more educated workforce and developing future leaders,” said President G. P. “Bud” Peterson. “We have world-class programs in STEM education, and we look forward to continuing to leverage this expertise to enhance the economic competitiveness of the state of Georgia.”



NASA Electronic Professional Development Network (ePDN) is a partnership between Georgia Tech and NASA to enhance the teaching skills of K-12 teachers in STEM subjects—science, technology, engineering, and mathematics. Above, students at Coretta Scott King Young Women’s Leadership Academy participate in a robotics exercise via the ePDN program.



Members of the Georgia Tech Equestrian Club provide much-needed care and attention for Atlanta Police Department horses during their off-duty hours.

Another federal grant—from the U.S. Defense Advanced Research Projects Agency (DARPA)—will provide manufacturing education programs to high school students. The base development contract includes about \$1 million for the first year, with the potential of \$10 million over four years to expand the projects.

Georgia Tech will provide prize-based educational challenges for high school students, encouraging them to use the latest technology to design and build items such as wind-turbine blades, mobile air and ground robots, and electric car bodies—hopefully inspiring the next generation of manufacturers.

The project is part of DARPA's Manufacturing Experimentation and Outreach (MENTOR) program. MENTOR is aimed at bolstering the U.S. manufacturing industry by sparking teens' interest in engineering, design manufacturing, and math- and science-related university programs. Georgia Tech's program will focus on introducing students to design and manufacturing processes by using 3-D printers and additive manufacturing. Social media will also play a role, as students will be able to connect via social networking sites and form teams that will compete to showcase their work.

In the arena of humanitarian relief, the Health & Humanitarian Logistics Center in the School of Industrial and Systems Engineering launched a Humanitarian Logistics Professional Certificate program for practitioners in non-governmental

organizations, government, industry, and the military who are active participants in humanitarian relief operations. The executive learning program is intended to build skills to improve decision making in preparedness, response, and system design.

Addressing the unique skills needed by professionals in the humanitarian world, Humanitarian Logistics Professional courses include methodologies for assessment, mobilization of resources, procurement, transportation, and distribution. The program is comprised of three courses: Pre-planning Strategy for Humanitarian Organizations, Systems Operations in Humanitarian Response, and Tactical Decision Making in Public Health and Humanitarian Response.

The courses include many interactive components, such as case studies and games, which help professionals in the humanitarian world to link the challenges and decision-making trade-offs they face in practice with the systematic approaches, tools, and techniques presented.

During last year's holiday season, Enterprise to Empower (En2Em) and the Georgia Tech Library hosted book drives for children locally and worldwide.

En2Em partnered with Better World Books, an online bookseller that donates a book to a child in need for each one it sells. Better World Books has raised \$10 million to support libraries and global literacy and education programs.

The Library's book drive helped fill bookshelves for the pediatric patients at Children's Healthcare of Atlanta.

Environmental Sustainability

In a competition hosted by the City of Atlanta and Emory University's Goizueta Business School, a team of Georgia Tech students earned first prize for proposing a system for electric vehicle adoption in Atlanta.

Undergraduates Corbin Klett, Matt Jacobson, Logan Maret, and Kevin Miron earned \$5,000 for their proposal of how to drive demand for 50,000 electric cars on Atlanta's roads during a two-year period. The students are part of Solar Jackets, Georgia Tech's student group dedicated to the design, creation, and expansion of solar technology.

"Our approach was to devise creative and unique solutions to electric vehicle adoption, emphasizing ways of reducing the cost to the city government," said Jacobson. "We stressed branding and education, creating a new electric vehicle brand we dubbed ChargeATL, and a website mockup to go along with it."

The City will use funding received from the U.S. Department of Energy to implement ideas generated from the competition, with the goal of the Atlanta area being the first region in the country to have 50,000 electric vehicles on its roads.

These efforts will be supported by a separate initiative allowing drivers of electric vehicles to recharge their systems at the Georgia Tech Hotel and Conference Center in Technology Square.



The pilot installation project, in partnership with Recharge Solutions International, provides a level II, 240-volt electric vehicle charging system, as well as a 110-volt electric fleet charging system for Georgia Tech service vehicles. The 240-volt chargers are available 24 hours a day to both the campus and general communities. Users will be able to register with the RSI system for either short- or long-term charging, paying by credit card or through monthly billing.

"We recognize the importance of reducing our carbon footprint," said David Williamson, Georgia Tech's associate director of transportation. "We anticipate that we will expand the two [charging] systems as demand grows for more electric cars being driven in and around Atlanta."

Just weeks after being recognized locally as the Atlanta Bicycle Coalition's Partner of the Year, Georgia Tech earned the national honor of being named a Bicycle Friendly University by the League of American Bicyclists. The Institute earned a silver designation among the 2012 group of honorees.

"We submitted an extensive application, which was reviewed by the League of American Bicyclists, as well as local judges who are familiar with Tech, Atlanta, and peer institutions," said Johann Weber, a graduate student in public policy who compiled and submitted the application as chair of the Bicycle Infrastructure Improvement Committee (BIIC). "The criteria are focused on the five Es—education, enforcement, engineering, encouragement, and evaluation."

New prosthetics center provides vital community service

Atlanta's Good Samaritan Health Center (GSHC) and Prosthetic Hope International, in cooperation with Georgia Tech's Master of Science in Prosthetics and Orthotics (MSPO) program, opened the Prosthetic and Orthotic (P&O) Community Clinic at Good Samaritan. Second-year MSPO students are primarily operating the new P&O lab with supervision from Georgia Tech research scientist Rob Kistenberg and licensed prosthetists and orthotists.

"The P&O Clinic at the Good Samaritan Health Center is an extraordinary opportunity for the students in the MSPO program, as it will provide a real-world clinical experience in a comprehensive and holistic healthcare environment," says Kistenberg, Georgia Tech's coordinator of prosthetics and the co-director of the MSPO program. "The students will be able to combine their didactic education with their clinical and technical skills in a supervised setting to provide prostheses and orthoses to the

underserved people in Atlanta. It's a win-win-win for everyone."

The clinic is being equipped and stocked through a grant from the St. Luke's Episcopal Outreach Program.

GSHC was founded in 1998 in downtown Atlanta with the mission of providing quality healthcare to those unable to afford it. The center is a full-time healthcare home that provides care to uninsured and underserved individuals and families in metro Atlanta with medical, dental, mental health, and health education services.

In 2010, more than 500 volunteers donated 10,000 hours of service and, together with the center's full-time staff, provided more than 23,700 patient visits. Roughly 65 percent of those treated were uninsured working poor. Patients pay for services based on a greatly reduced sliding fee scale. Those who are unable to pay receive care at no charge. ■



"Biking not only enhances mobility, but also has positive environmental and health benefits for our campus community," said President G. P. "Bud" Peterson. "I want to commend our student leadership

and members of the Bicycle Infrastructure Improvement Committee who have worked so diligently in making Georgia Tech an official 'bike friendly' campus." ■



THE PRESIDENT'S CABINET

Standing from left:

William D. Schafer
Vice President for Student Affairs

G. P. "Bud" Peterson
President

Steven G. Swant
Executive Vice President for
Administration and Finance

Archie W. Ervin
Vice President for Institute Diversity

Center Left:

Lynn M. Durham
Assistant Vice President

Center Right:

Patrick J. McKenna
Associate Vice President,
Legal Affairs and Risk Management

Seated:

Stephen E. Cross
Executive Vice President for Research

THE PRESIDENT'S CABINET

Standing from left:

Dene H. Sheheane
Executive Director of Government
and Community Relations

Barrett H. Carson
Vice President for Development

Michael L. Warden
Vice President for Institute
Communications

Colin Potts
Vice Provost for
Undergraduate Education

Center:

Rafael L. Bras
Provost and Executive Vice
President for Academic Affairs

Seated:

Susan E. Cozzens
Vice Provost for Graduate
Education and Faculty Affairs



