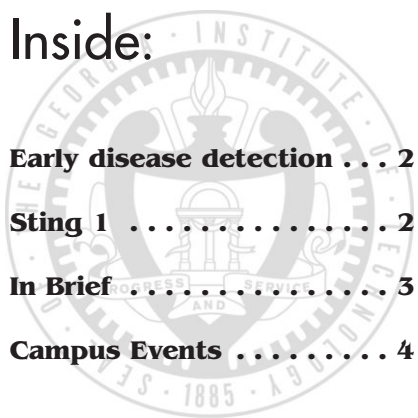


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THE WHISTLE

FACULTY/STAFF NEWSPAPER

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THE GEORGIA INSTITUTE OF TECHNOLOGY

Tech reaches its highest U.S. News rank ever

Colleges of Engineering, Management see gains

Georgia Tech ranks seventh among the nation's public universities for undergraduates — the highest ranking in the Institute's history — and is among the top 10 public universities for the ninth consecutive year. According to U.S. News and World Report, Tech moved up to the seventh spot from eighth last year and moved up two spots to 35th among all national universities.

Georgia Tech's internship and cooperative education programs were ranked among the 14 "Academic Programs to Look For" under internships for the second consecutive year. Tech was also selected as one of 35 outstanding examples of undergraduate research opportunities for the second consecutive year.

"Georgia Tech continues to distinguish itself as one of the top national universities over the last decade," said President Wayne Clough. "This recognition reflects the high quality of our programs, faculty, students and our growing momentum."

"I am especially pleased to see Georgia Tech among the leaders in internship and co-op opportunities as well as undergraduate research," he said. "Georgia Tech consistently seeks to offer our students the best academic experience possible, and that includes real-world and research opportunities."

Tech's College of Engineering, the nation's largest, moved up in the national rankings to fifth compared to sixth last year. The College had four of its programs ranked in the top five among specialty areas: industrial engineering ranked first, aerospace ranked second, biomedical placed third and civil engineering fifth.

The College of Management is also seeing a surge in notoriety as it rises in the rankings for both its undergraduate and graduate programs, as indicated by reports from several national publications.

Tech's business school jumped 11

Rankings continued, page 3

Freshman convocation



Two R.A.T.S. (Recently Acquired Tech Students) don special caps during Freshman Convocation, an official induction into the Georgia Tech community marked by a welcome from President Wayne Clough. One of Tech's oldest traditions, R.A.T.S. caps began with the campus ROTC program, which required new students to wear undersized, bright yellow hats at all times.

Tech leaders offer expertise to congressional panels

As Georgia Tech's reputation as a global leader in technology and innovation continues to spread, the Institute's leaders are increasingly being sought out by the federal government to offer their expert counsel on a host of policy-related matters.

Such was the case in July when three prominent Georgia Tech leaders were asked by subcommittees of the U.S. House Committee on Science and Technology to offer testimony on the next 25 years of technology transfer under the Bayh-Dole Act.

Provost Gary Schuster and Regents' Professor of Electrical and Computer Engineering Mark Allen — who was recently appointed senior vice provost for Research and Innovation — testified before the Subcommittee on Technology and Innovation, while Mechanical Engineering Professor Paul Neitzel testified before the Subcommittee on Space and Aeronautics.

When it was enacted in 1980, the Bayh-Dole Act signaled a historic shift in U.S. patent law by giving universities, small businesses and non-profits intellectual property control of their inventions that resulted from federal government-funded research.

In return for these rights, universities are expected to file for patent protection and to ensure commercialization upon licensing. Bayh-Dole has been a boon to university technology transfer because it has sped up the commercialization process of federally funded university research and helped new industries to develop more quickly.

International education and partnerships

In his testimony, Schuster addressed the issue of how overseas campuses of Georgia Tech and other American universities advance the global science and technology enterprise.

"Our overseas campuses offer us an opportunity to participate in research with partners whose

Testimony continued, page 3

New senior vice provost named

The Office of the Provost and Executive Vice President for Academic Affairs has named Mark Allen the new senior vice provost for Research and Innovation. The position, most recently held by Charles Liotta, will influence research opportunities and directions for Georgia Tech and is a key part in the provost's reorganization announced earlier this year.

"I am extremely pleased that Mark will be leading our research, commercialization and economic development activities here at Georgia Tech," said Gary Schuster, provost and executive vice president for Academic Affairs. "He brings a wealth of experience and expertise in both research and technology transfer to our leadership team, and he will be an excellent advocate for Tech."

Allen comes to the provost's office after serving as Regents' professor and J.M. Pettit Professor in Microelectronics in the School of Electrical and Computer Engineering and the School of Chemical and Biomolecular Engineering. He is also



Mark Allen will form part of the provost's leadership team, influencing research opportunities and directions for Georgia Tech.

co-founder of CardioMEMS, a biotechnology start-up company that produces cardiovascular sensors based on technology he developed.

As a member of the provost's senior leadership team, Allen will be instrumental in setting the Institute's research and economic development agenda and strategic direction. He will not only manage Tech's \$458 million research portfolio, but also oversee the commercialization of innovation, ensuring that the Institute takes maximum advantage of the intellectual property developed in its research labs.

Allen continued, page 3

QUOTE UNQUOTE

"No natural mechanism accounts for the large climate change we've seen. There's nothing we can do, other than shut down all human activity, to change what's going to happen over the next 30 years. There's not a lot you can do about it other than try to slow it down a little."

—Robert Dickinson, a professor in the School of Earth and Atmospheric Sciences, to a state legislative committee investigating whether global warming is being caused or accelerated by humans. (Savannah Morning News)

Nanoparticle could aid in early disease detection

Researchers first to image hydrogen peroxide in animals

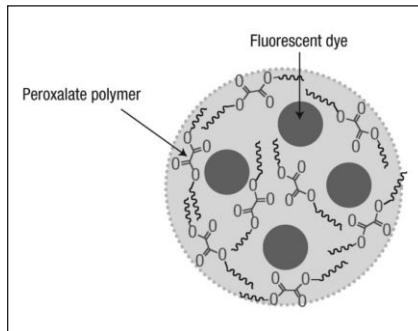
Megan McRainey
Institute Communications
and Public Affairs

Most people think of hydrogen peroxide as a topical germ killer, but the medicine cabinet staple is gaining steam in the medical community as an early indicator of disease in the body.

Georgia Tech and Emory University researchers are the first to create a nanoparticle capable of detecting and imaging trace amounts of hydrogen peroxide in animals. The nanoparticles, thought to be completely non-toxic, could some day be used as a simple, all-purpose diagnostic tool to detect the earliest stages of any disease that involves chronic inflammation — everything from cancer and Alzheimer's to heart disease and arthritis.

The research, led by the laboratories of Niren Murthy in the Department of Biomedical Engineering and Robert Taylor in the Division of Cardiology at the Emory University School of Medicine, will appear in the October issue of *Nature Materials*.

Hydrogen peroxide is thought to be over-produced by cells at the early stages of most diseases. Because there were previously no imaging techniques available to capture this process in the body, the details of how the hydrogen peroxide is produced and its role in a developing



The nanoparticle polymer is made of peroxalate esters. A fluorescent dye (pentacene) is then encapsulated into the polymer. When the nanoparticles bump into hydrogen peroxide, they excite the dye, which then emits photons that can be detected on a scan.

disease must still be determined.

But these recently created nanoparticles may be the key to better understanding the role of hydrogen peroxide in the progression of many diseases and later play an important diagnostic role.

"These nanoparticles are incredibly sensitive so you can detect nanomolar concentrations of hydrogen peroxide. That's important because researchers aren't yet certain what amounts of hydrogen peroxide are present in various diseases," Murthy said.

The ultimate goal, however, is that the nanoparticles could some day be used as a simple, all-purpose diagnostic tool for most diseases. In the future, the nanoparticle would be injected by needle into a certain area of the body. If the nanoparticles

encountered hydrogen peroxide, they would emit light. Should a doctor see a significant amount of light activity in the area, the doctor would know that the patient may be presenting early signs of a disease in that area of the body.

The Georgia Tech and Emory nanoparticles penetrate deep tissue and operate at a high wavelength, making them sensitive indicators of the presence of hydrogen peroxide produced by any sort of inflammation.

The nanoparticle polymer is made of peroxalate esters. A fluorescent dye is then encapsulated into the polymer. When the nanoparticles bump into hydrogen peroxide, they excite the dye, which then emits photons that can be detected with a simple scan.

"It's using this nanoparticle made of peroxalate esters that allows you to do this three-component reaction in vivo," Murthy said. "If you were to inject a peroxalate ester and a dye, they would go their own ways once in the body. With the nanoparticles, we can sequester both of these reagents within nanometers of each other, in vivo."

The group will conduct further tests with the nanoparticles to confirm their safety and effectiveness.

For more information...

Laboratory for Biomaterials and Molecular Imaging
www.bme.gatech.edu/groups/murthylab



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Sting Racing in semi-finals of DARPA Urban Challenge

The College of Computing announced earlier this month that the Sting Racing team competing in the Defense Advanced Research Projects Agency's (DARPA) Urban Challenge has passed its site visit and is judged technologically capable of competing in the semi-final round. The team's autonomous vehicle, Sting 1, successfully completed all four tests during its capabilities evaluation in June, taking it into the next stage in this two-year competition among leading research and technology universities in the United States.

"As a first-year competitor in the Urban Challenge, qualifying for the semi-final round is a major accomplishment and testament to the passion and dedication of our team," said Henrik Christensen, a professor in the School of Interactive Computing and principal investigator for Sting Racing. "Our robotics program is relatively new, but the progress we have shown over a short period of time has positioned us among the best in the nation."

During the visit, DARPA personnel assessed the ability of the autonomous vehicle to perform tasks



The goal for Sting 1, above, is to achieve fully autonomous operation.

and operate safely. Sting was evaluated on its ability to navigate a test course — a subset of the challenges that the robotic vehicles will face on the Urban Challenge course, such as merging into moving traffic, navigating traffic circles, negotiating busy intersections and avoiding obstacles.

A collaboration between the College of Computing, College of Engineering and Georgia Tech Research Institute, Sting Racing selected a Porsche Cayenne as the base vehicle for its entry in the Urban Challenge. For nearly a year members of the Sting Racing team have been working to program the robot to drive autonomously by staying on course and recognizing obstacles in its way.

"We put in a lot of long hours over the past year preparing Sting 1 for the site visit — the first major trial in the Urban Challenge," noted Matt Powers, an undergraduate student and member of the Sting Racing team. "So passing all four tests during the site visit was extremely rewarding."

DARPA uses the site visit evaluation to select the competition's semi-finalists — the top 36 teams that will participate at the National Qualification Event in October.

The Urban Challenge is the third in a series of DARPA-sponsored competitions to foster the development of robotic ground vehicle technology without a human operator, designed for use on the battlefield, executing simulated military supply missions safely and effectively in a mock urban area. DARPA will award \$2 million, \$1 million and \$500,000 awards to the top three finishers that complete the course within the six-hour time limit.

For more information...

Sting-Racing
www.sting-racing.org

Testimony, cont'd from page 1

expertise exceeds ours in particular areas and allows us access to international research opportunities and technologies that would otherwise be unavailable to Americans,” Schuster told the subcommittee. “Specifically in terms of graduates, these campuses enrich our ability to produce citizens of the world, educated by professors who operate in an international context and presented with opportunities to study abroad that are not available to typical engineering and science students. The importance of these opportunities to our students is reflected in the strong interest by corporate and government recruiters in hiring them and in reports from our graduates themselves.”

Schuster went on to explain that Georgia Tech aspires to be a truly global university that contributes to the economic competitiveness of Georgia and the United States through a variety of innovative partnerships.

“The faculty and students of our home campus participate in these partnerships,” said Schuster, “and the knowledge and experience they gain enrich Georgia Tech’s home campus and carry over into the relationships we have with American industries and with international partners who seek us out and create partnerships with us in Atlanta. Georgia Tech is also committed to strengthening the international elements of the education we offer our students, and we have added an International Designator to many undergraduate majors, incorporating a global context into the course of study.”

The value and role of federal research

Allen presented to the subcommittee a number of recommendations proposed by a panel within the President’s Council of Advisors on Science and Technology. Its report focused on the value of federal research in maintaining America’s economic leadership as it relates to the commercial use of technology developed with federal funding. Among other recommendations, the report’s primary findings included:

- Existing technology transfer legislation works and should not be altered.
- Federal agencies, government laboratories, and the Department of Commerce need to formalize their oversight of and accountability for technology transfer.
- The government should centralize information



Provost Gary Schuster, second from left, was joined by Cornell University President David Skorton, Carnegie Mellon University’s School of Public Policy and Management Dean Mark Wessel and Boston College’s Center for International Higher Education Director Philip Altbach.

on technology transfer into a single, accessible location.

- Recent discussions about the availability of research tools that result from federally funded research need to be monitored to ensure that there is a balance in the protection of the commercial value of such inventions and assurance of access to these tools for further research and exploration.

The International Space Station as a research lab

In his testimony before the Subcommittee on Space and Aeronautics, Neitzel was asked to address several questions regarding the viability and potential research value of NASA’s planned International Space Station (ISS).

“As a member of two task groups that studied the management of research utilization aboard the ISS, I am generally supportive of the concept of operating the U.S. research facilities on board the ISS as a national laboratory,” said Neitzel. “A principal benefit is the buy-in that is likely to come from the external research community to a laboratory managed by a consortium of their peers. What is disconcerting about NASA’s plans for the national laboratory concept, however, is that there is virtually no funding associated with it, either to support in-house or external research or to provide for transportation of experiments to and from the ISS.”

Allen, cont'd from page 1

“I’m excited about the opportunity to serve Georgia Tech in this new capacity and hope to continue the success we have experienced in research and technology transfer,” Allen said. “Georgia Tech is already a recognized leader in

these areas, and I look forward to helping us realize the significant potential for further growth that is vitally important to Tech’s future.”

Finalists were selected by a committee comprised of faculty members and campus leaders chaired by College of Engineering Dean Don Giddens. Liotta will be returning to the faculty.

Rankings, cont'd from page 1

spots in Forbes magazine’s MBA rankings, rising to 34th overall and 15th among public universities. Forbes bases its rankings, which are issued every two years, on graduates’ return on investment, meaning compensation five years after graduation minus tuition and forgone salary during school.

In its first-time rankings of “America’s Best Colleges for Entrepreneurs,” Fortune Small

Business listed the College of Management among the top schools for MBAs and among the best for double major or cross-disciplinary students, while U.S. News and World Report ranked Georgia Tech’s undergraduate business program 33rd in the nation, up two spots from last year.

Additionally, Georgia Tech alumni continue to be among the most generous in giving back to their alma mater. The percentage of Tech graduates contributing to the Institute is the highest for any public university ranked in the top 50.

IN BRIEF:

Parekh to join UTC

Georgia Tech Research Institute Deputy Director David Parekh will be leaving Georgia Tech to become director of the United Technologies Research Center and the company’s vice president for research.

Parekh has been deputy director of the Georgia Tech Research Institute since 2003. At GTRI, Parekh has had primary responsibility for research operations, business development, commercialization and the institute’s internal research portfolio. He has also served concurrently as associate vice provost for research at Georgia Tech and as president of Georgia Tech Ireland, the university’s nonprofit corporation. He led the team that created GT Ireland, which was founded in 2006 to conduct basic and applied research programs with multinational corporations and universities in Europe.

“David epitomizes creativity and innovation and he is very deserving of this wonderful opportunity, but we are sad to see him go,” said GTRI Director Stephen Cross. “His years at Georgia Tech have been filled with many firsts. He routinely made the impossible possible and motivated the rest of us to do the same.”

Untangling the office

New research at Georgia Tech could soon make that tangle of wires under desks and in data centers a thing of the past.

Scientists at the Georgia Electronic Design Center (GEDC) at Georgia Tech are investigating the use of extremely high radio frequencies to achieve broad bandwidth and high data transmission rates over short distances.

Within three years, this “multi-gigabit wireless” approach could result in a bevy of personal area network applications, including next generation home multimedia and wireless data connections able to transfer an entire DVD in seconds.

The research focuses on RF frequencies around 60 gigahertz, which are currently unlicensed — free for anyone to use — in the United States. GEDC researchers have already achieved wireless data-transfer rates of 15 gigabits per second (Gbps) at a distance of 1 meter, 10 Gbps at 2 meters and 5 Gbps at 5 meters.

“The goal here is to maximize data throughput to make possible a host of new wireless applications for home and office connectivity,” said Joy Laskar, GEDC director and lead researcher on the project along with GEDC research scientist Stephane Pinel.

GEDC’s multi-gigabit wireless research is expected to lend itself to two major types of applications: data and video, said Pinel. Very high speed, peer-to-peer data connections could be just around the corner, he believes — available potentially in less than two years.

Other new faculty

Electrical and Computer Engineering

Jongman Kim (Savannah)
Jeff Shamma
Hongwei Wu (Savannah)

Industrial and Systems Engineering

Nagi Gebaeel