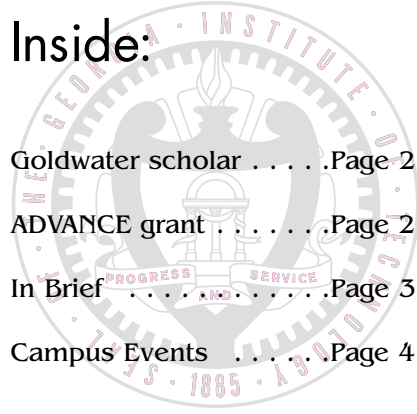


Inside:

- Goldwater scholar . . . . .Page 2
- ADVANCE grant . . . . .Page 2
- In Brief . . . . .Page 3
- Campus Events . . . . .Page 4



# THE WHISTLE

FACULTY/STAFF NEWSPAPER

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THE GEORGIA INSTITUTE OF TECHNOLOGY

## GTRI advances ozone monitoring with NEXLASER

Jane Sanders  
Research News

**K**nowing the concentration of ozone in the air above urban areas is a missing piece of important information for ozone pollution forecasters.

Atmospheric scientists studying ozone pollution also need this information to help determine the "sources and sinks" — where it is created and where it goes — of air pollutants. In turn, metro area planners could devise effective strategies to address air quality issues.

With these ultimate goals in mind, a team of engineers at the Georgia Tech Research Institute (GTRI) is designing the next generation of ozone-monitoring technology. Based

on light detection and ranging (LIDAR) technology developed by the National Oceanic and Atmospheric Administration, the new version will make ozone monitoring continuous and affordable, and results will be available via the Internet in real time.

Funded by a Technology Development Partnership through the Georgia Research Alliance and LaserCraft Inc. of Norcross, the device has been dubbed NEXLASER for NEXt Generation Laser Air Sensor for the Southeastern Region (though the technology could be applied anywhere in the world).

"NEXLASER will be great for ozone forecasting, and it should enable people to do new kinds of research projects in city planning, environmental engineering and atmospheric

chemistry," said GTRI project director Gary Gimmestad. "Right now, it's hard to correlate anything like traffic patterns with ozone. It's just not accurate yet because there's not enough information."

NEXLASER will adapt and automate the operation of LIDAR, which in the past has been suitable only for short-term studies because it requires numerous personnel to operate it.

Senior research scientist Michael



Leanne West and Jack Wood are part of the research team developing a cost-effective ozone monitoring system.

Chang in the School of Earth and Atmospheric Sciences is hopeful

*Ozone continued, page 3*

## Smart Shirt headed to Smithsonian Institution

Larry Bowie  
Institute Communications  
and Public Affairs

**I**t has been a good year for the "Smart Shirt" — the t-shirt developed at Georgia Tech that functions like a computer to let doctors monitor the vital signs of the wearer.

First, Time Magazine named the shirt one of the best inventions of the year. Now, the Smart Shirt is on its way to Washington, D.C., to take its place among the Smithsonian Institution's collection of important items in the history of textiles.

The collection, housed in the National Museum of American History, consists of about 50,000 items dating from the 17th century to the present time and includes items that relate to the art and industry of textiles, as well as textiles-related inventions.

Among the latter: An original model of an Eli Whitney cotton gin made by the inventor in the early 1800s; and a patent model of Elias Howe's and Isaac Singer's sewing machines.

Made of a soft, washable fabric with optical and electrical fibers woven into it, the Smart Shirt monitors the wearer's heart rate, respiration, temperature and a host of other vital functions. The information is



relayed wirelessly and can be sent on to doctors or personal trainers.

Future applications include shirts for parental use to monitor babies and for military use to provide a trapped soldier's exact location and give triage units details about wounds.

Sundaresan Jayaraman, a professor in the School of Textile and Fiber Engineering, is the lead developer of the Smart Shirt technology. The project was initially funded by the U.S. Navy in October 1996. In 2000, the Georgia Tech Research Corporation licensed the technology to New York-based SensaTex Inc. to manufacture and market the Smart Shirt.

## Study: University System an \$8 billion asset to state

2 percent decrease from  
FY 2000

Michael Hagearty  
Institute Communications  
and Public Affairs

**I**n a study released last month, the University System of Georgia was reported to have an \$8 billion impact on the state's economy during the last fiscal year.

Conducted by the Selig Center for Economic Growth in the University of Georgia's Terry School of Business, the study analyzed three categories of college and university-related expenditures: spending by institutions for operations, spending by institutions for capital projects and spending by enrolled students.

Of the University System's total economic impact, \$5 billion represents initial spending by the University System institutions and the students attending them. The remaining \$3 billion, it was reported, represents the impact generated by the re-spending of those dollars. What this means is that, on average, each dollar spent by the System and its students injects an additional 56 cents into the host region's economy.

In response to the study's findings, Chancellor Thomas Meredith

said, "The University System truly is an economic engine that helps to power our state on many levels, from producing graduates to building capital projects, to leveraging our employment and spending power."

The System collectively accounts for more than 100,000 jobs — 2.8 percent of the state's workforce — generating \$3.7 billion in labor income last year.

The seven Atlanta-area campuses — Georgia Tech, Georgia State University, Kennesaw State University, Georgia Perimeter College, Clayton College and State University, Southern Polytechnic State University and Atlanta Metropolitan College — accounted for \$3 billion of the System's \$8 billion impact. Of those, Tech's impact was the greatest, pumping \$1.3 billion into the economy during the last fiscal year.

The author of the report also indicated that these figures were conservative, because it did not factor in figures such as spending by people who visited campuses within the University System, athletic events or reunions, and income earned by System employees through consulting and other activities.

The overall impact represents a 2 percent decrease since the last time the study was conducted — an \$8.2 billion impact during fiscal year 2000.

## QUOTE— UNQUOTE?

"We hope there is some learning element involved, something that helps students to be better people."

—Sara Cames, an undergraduate in the School of Public Policy and chair of the Honor Advisory Council, on the formulation of an honor code that is intended to deter cheating without being excessively harsh, as has been charged of other university codes. (*Chronicle of Higher Education*)

"(For the authors) to conclude that Harvard might 'set an example other American universities would want to follow' is to overlook the progress at Georgia Institute of Technology and many other universities. We'll be watching Harvard, but innovation is already happening."

—Richard Barke, associate dean of Ivan Allen College, in response to an article on Harvard University President Lawrence Summers and his plans to overhaul the school's academic environment. (*Business Week*)

## Bacteria help Tech student win Goldwater

David Terraso  
Institute Communications  
and Public Affairs

Michael Lubarsky is up to his elbows in bacteria. Over the past year, the Georgia Tech junior has been working in Sheldon May's biochemistry lab helping him find ways to use bacteria to create biodegradable plastics. The plastics could make everyday items such as detergent bottles safer for the environment, allowing them to decompose rather than sit around a landfill for hundreds of years. Work on such undergraduate research projects helped the 21-year-old biology major win a Goldwater scholarship — that and his 4.0 grade point average.

Lubarsky came to this country only four years ago after his father, Eugene, took a job as an aerospace engineer at Tech. Born in the former Soviet Union, Lubarsky's family emigrated to Israel ten years later where he became an Israeli citizen. Now that he's in the United States, Lubarsky said he plans to apply for citizenship once he becomes eligible in two years.

"The thing I like about the United States is, if you work hard enough, you'll get what you want. In other places it's not necessarily like that," he said.

And he's definitely working hard. Back at the biochemistry lab, where

his lab mates greet him with a chorus of "Misha!" (Russian for Mike), he's been trying to coax bacteria to produce the biodegradable polymers that make up plastics. By isolating the polymer-producing parts of the bacteria, the researchers hope they can learn to make the polymers without having to rely on the microorganisms.

"Bacteria have a life cycle of their own and it's hard to make them produce what you want, when you want it. So we're trying to learn how to make the eggs without the chicken, so to speak," said Lubarsky.

This summer he'll begin an internship at the Jet Propulsion Laboratory at the California Institute of Technology, where he'll study bacteria that can live in extreme environments, such as the International Space Station or along the cones of volcanoes.

After he graduates next May, he wants to go to medical school and eventually become a research physician studying infectious diseases.

"I really like working with people, not just doing research. Being a doctor is the best way I can contribute to society," Lubarsky explained.



Michael Lubarsky's lab work involves using bacteria to create biodegradable plastics.

Photo by David Terraso

By paying up to \$7,500 toward next year's tuition, fees, room and board, the scholarship should help him save money for medical school. This year the Barry M. Goldwater Scholarship and Excellence in Education Foundation awarded 309 scholarships to students in the United States and Puerto Rico.

The Foundation is a federally endowed agency established in 1986. The Scholarship Program, honoring former Arizona Senator Barry M. Goldwater, was designed to foster and encourage outstanding students to pursue careers in the fields of mathematics, the natural sciences and engineering.

## NSF ADVANCE professorship program under way

Developing research and leadership among women in science

Larry Bowie  
Institute Communications  
and Public Affairs

Georgia Tech has officially begun work on the ADVANCE Program for Institutional Transformation and the advancement of women in science and engineering, funded by a \$3.7 million grant from the National Science Foundation (NSF).

In December 2001, four senior women faculty members, one each from the Colleges of Engineering, Computing, Sciences, and Ivan Allen, were selected to hold NSF ADVANCE Professorships. Each faculty member will receive annual funds for five years to support her



From left, Mei-Yin Chou, Jane Ammons, Mary Jean Harrold and Mary Frank Fox.

research and leadership activities to advance women in her respective college, and Institute-wide. The Professorships will be held by Jane Ammons, professor of Industrial and Systems Engineering; Mei-Yin Chou, professor of Physics; Mary Frank Fox, professor of Sociology; and Mary Jean Harrold, associate professor of Computing.

As a co-principal investigator (co-PI) for the grant, Fox will be working

closely with co-PIs April Brown, Petitt Professor of Microelectronics in Electrical and Computer Engineering, and Sue Rosser, dean of Ivan Allen College, to provide direction and leadership for campus-wide institutional change, which is the goal of the NSF grant.

As part of the NSF ADVANCE program, Tech will also host annual mini-conferences for tenure-track academic female faculty members, school chairs and deans. The first conference, held earlier this month, was intended to provide female faculty members and key Tech leaders a chance to interact and discuss methods for improving the status of women at Tech.

For more information...

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Georgia Tech



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Georgia Tech is a unit of the University System of Georgia.

## Assistant tapped as new head coach for volleyball team

Georgia Tech assistant volleyball coach Bond Shymansky has been named the Yellow Jackets' head coach, succeeding Shelton Collier, who resigned in January after 11 years at the helm.

Collier hired Shymansky in February 2000 as defensive

coordinator. Under Collier's and Shymansky's leadership, the Jackets finished the 2000 season with a 25-8 record, won the ACC regular season championship and earned an at-large bid to the NCAA Tournament. The 2001 team finished 19-8 and earned a second trip to the national

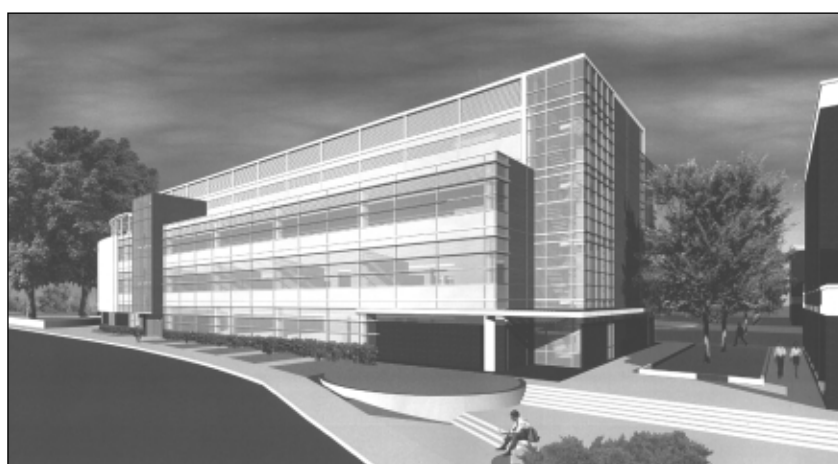
tournament.

Shymansky hired two assistant coaches. Ben Bodipo-Memba, a former assistant at Western Carolina University and a member of the United States national team, and Sally Schulte, a former assistant coach at Indiana University.

## IN BRIEF:

### Biomedical engineering building breaks ground

Flanked by mascots Buzz and Swoop, College of Engineering Dean Don Giddens pitches his shovel in the dirt at a ceremonial groundbreaking for the \$23 million U.A. Whitaker Building, the third of a four-building complex devoted to instruction and research in biotechnical, environmental and molecular disciplines. The Whitaker Building (proposed design shown below) will house the Wallace H. Coulter School of Biomedical Engineering, a 90,000-square-foot facility that will provide a permanent home for the joint Georgia Tech-Emory University school, and will stand alongside the Parker H. Petit Institute for Bioengineering and Bioscience and the soon-to-be-completed Ford Environmental Science and Technology Building. Together with the Molecular and Materials Science and Engineering Building, the BEM complex will serve as a high-profile focal point for Tech's involvement in bioengineering, biomedicine and related fields.



### Ozone, cont'd from page 1

about NEXLASER. "If they can pull this off and get a unit that is affordable, it would be great," Chang said. "We can do this type of monitoring now, but it requires a \$2 million investment.

"All of the air quality monitoring we do now is essentially at the surface. But what's above the surface is extremely critical in terms of the air quality at the surface, particularly in the late afternoon. NEXLASER could be the single greatest improvement to our ozone forecasting at this time. We're looking forward to it with great anticipation," Chang added.

Researchers have completed a laboratory version of NEXLASER and a prototype of software to automate data analysis. They recently began operating, testing and evaluating the system in their lab. The next phase, which may begin this summer, will be field-testing.

After that, researchers would work with LaserCraft engineers to develop a commercial version of NEXLASER, at a cost of about \$250,000 per unit. Gimmestad hopes a network of six NEXLASER units will be deployed within two years at Georgia Environmental

#### How it works:

- 1) A laser emits pulses of light that scatter into the atmosphere.
- 2) A telescope receives that scattered light.
- 3) A detector converts the light to electronic signals.
- 4) A data system digitizes and stores those signals.
- 5) Finally, researchers determine the distance the light scattered by multiplying the speed of light by the flight time it took the pulse to travel up and back.

This information reveals the ozone concentration at periodic measured distances because ozone absorbs one color of light emitted from the laser, but not another. So a dense concentration of ozone would lessen the distance light scatters.

Protection Division field sites around metro Atlanta.

"Atlanta is the perfect test case for a NEXLASER network," Gimmestad said. "It has the third-worst air quality in the nation after Los Angeles and Houston. We hope the NEXLASER technology would be adopted by other cities within five years."

Meanwhile, much work must be done in the lab, the field and the commercial arena. Because LaserCraft is funding part of the NEXLASER research, it has the rights to license the technology. Georgia Tech would grant an actual license to LaserCraft after Gimmestad's team completes field-testing.

The other GTRI researchers involved with the study are project lead engineer Dave Roberts, and engineers John Stewart, Leanne Little West and Jack Wood.

### Golf team receives multiple honors

The Atlantic Coast Conference recently named three Georgia Tech players — Troy Matteson, Kris Mikkelsen and Matt Weibring — to the all-ACC men's golf team, while head coach Bruce Heppler was named Coach of the Year and freshman Chan Wongluekiet was voted Rookie of the Year by the conference.

"We have never had four players on the all-ACC team, but this is probably the best we've ever done," said Heppler, whose coach of the year honor is his third in seven years at Tech.

Tech, which has won the ACC title three times in the last four years, has won a school-record six tournaments this year, two in the fall and four in the spring.

At press time, the team was playing as the top seed in the NCAA East Regional Championship at Ansley Golf Club's Settindown Creek in Roswell. The top 10 finishers in the 27-team field will advance to the NCAA Men's Golf Championship in Columbus, Ohio, at the end of the month.

### Softball squad an ACC surprise

Having won its first-ever Atlantic Coast Conference title earlier in the day, the Georgia Tech softball team (49-16, 6-2 ACC) learned it earned an at-large bid to the NCAA Championships, another first for the Jackets.

At press time, the regional winner had not been determined. However, should the Jackets win the double-elimination event, they would advance to the Women's College World Series in Oklahoma City, May 23-27.

### GT hotel fills management position

David Durbin, the chief operating officer of Crestline Hotels and Resorts, announced the appointment of Vicki Walker as director of Sales & Marketing at the Georgia Tech Hotel and Conference Center, scheduled to open in the summer of 2003.

Walker is a long-time Georgia resident who received her bachelor's and master's degrees from Georgia State University. In addition to her sales career, she has been a part-time instructor in communications at Georgia State University, Georgia Perimeter College and Gainesville College.

The 250-room hotel is an integral part of the Technology Square development. Adjoining the hotel will be the Georgia Tech Global Learning Center that will create an international learning environment with multiple amphitheaters and classroom facilities. The property is wholly owned by an entity created by the Georgia Tech Foundation and will be managed by Crestline Hotels and Resorts.

### Academic catalog now on-line

The Georgia Tech General Catalog 2001-2003 is now available on-line through the Office of the Registrar's web site at [www.registrar.gatech.edu](http://www.registrar.gatech.edu) (select Catalog) or directly at [www.gatech.edu/gen\\_catalog](http://www.gatech.edu/gen_catalog). The site is currently navigable and will be searchable in the fall. For up-to-date course offerings and the academic calendar, consult [www.oscarweb.gatech.edu](http://www.oscarweb.gatech.edu).